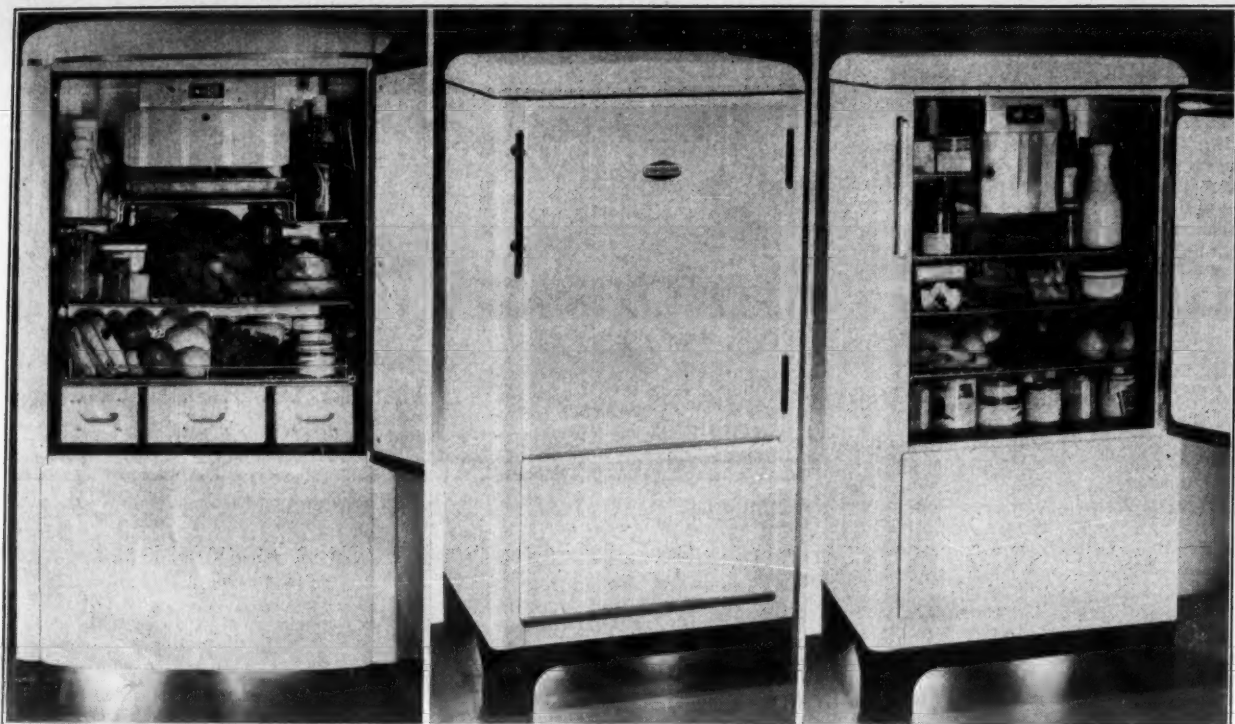


Two Different Types of Models in 1937 Copeland Line



At the left is shown the interior of the 9-cu. ft. model, featuring the "4-in-1" food file and other convenience features. In the center is the exterior of the 5-cu. ft. model and at the right is the interior of the 5-cu. ft. box.

Fire Destroys Crosley Cabinet Plant

(Concluded from Page 1, Column 5) from our Cleveland and Connersville sources."

Mr. Crosley reviewed the condition of the other plants which are in varying depths of water, but which otherwise will be ready for immediate occupancy and use as soon as the flood waters recede and electric power is restored.

"Plant No. 3, in which our service department was housed, has water to the second floor. However, we were able to anticipate the rise of the water and our service department had been moved into our main plant where it is ready to function immediately on restoration of electric power, water, heat, and shipping facilities. During the crisis of the

situation only food stuffs and necessities are being handled by the railroads."

Mr. Crosley gave great credit to the fire and police departments of Cincinnati and to the volunteer firemen from the numerous other cities who assisted in overcoming the fire.

"It was due only to the heroic action upon the part of the Cincinnati police and fire departments, and volunteer assistance from many outside sources that our main plant was safe," he said.

"Hose lines were carried through dense smoke from the Colerain entrance through to the windows on the fire fronts of the main plant which was preserved intact.

"I cannot be too complimentary about the way that the flood situation has been handled by the Cincinnati officials, the Red Cross, and the various other units whose cooperation has been masterly. Our one hope now is that there will be no more rain until these flood waters can recede. All agencies are set to restore everything to normalcy very quickly thereafter."

Explosion of Gasoline on Flood Waters Was Cause

CINCINNATI—The fire which started with an explosion of gasoline near the Baltimore & Ohio roundhouse in the Mill Creek Valley industrial district here, and which destroyed Plant "K" of the Crosley Radio Corp., caused damage estimated at nearly \$2,000,000, about half of which was in the Crosley properties, according to estimates made by Assistant Fire Chief Sherwood.

The maintenance department of the Crosley company, declared Lewis M. Crosley, vice president and general manager, is working at full speed to allow restoration of operations as soon as the water leaves the lower floor of the main plant, which was not damaged by the fire.

The fire was said to have been caused when a trolley wire fell in gasoline floating on the floodwaters. The flood had overturned several tanks in the vicinity.

"The first building to be touched by the flames was Plant 'K' of the Crosley Radio Corp.," said Cincinnati Police Chief Eugene T. Weatherly, in describing the fire.

"Next, the Oberhelman - Ritter Foundry, out of the water, started to burn. Then the Crosley garage went up in flames.

William B. Giese, chief inspector of the Crosley plant, said the fire started at about 10 a. m.

"The first warning apparently came in a flash near the Baltimore & Ohio Railroad Roundhouse," he said. "There was an explosion over the water which was covered with one-half inch of oil and gasoline. Flames

came clear over the eight-story Crosley main building.

"It was a godsend that the windows were closed. About 200 of us in the plant, including studio workers, crawled through every available exit."

In fighting the fire in the rear of the Crosley refrigerator assembly plant, three companies concentrated efforts on keeping the roof of an enameling storeroom cool. They were successful in preventing an explosion of volatile enamels and paints.

With these firemen standing at the edge of an inferno was another company huddled near the water's edge behind a concrete wall directing a line against the base of an 80-ft. metal stack which threatened to topple over.

The fire raged on three sides of the eight-story main building, which also incorporates the main studios of WLW. Outside of broken glass windows, principally on the southern and western sides, this building escaped the ravages of the fire.

1937 Copeland Smaller Models Have New Design

(Concluded from Page 1, Column 5) the model which has a 7.1 net cu. ft. capacity sells for \$214.90.

Cabinets for the 4, 5, and 6-cu. ft. models are made by Seeger. They have rounded corners, a patterned front, a bar-type door opener, and a Dulux exterior finish. Hardware is chrome finished.

These three models are also equipped with the "Humidipak" evaporator made by Peerless of America, Inc. These evaporators, sheathed in copper with a brass door, are fitted in the rear with a tripe-fin arrangement to provide rapid heat transfer but with proper air circulation. Shelves are in direct contact with refrigerant tubing to provide for fast freezing.

A number of refinements have been made in the two-cylinder, slow-speed, methyl chloride compressor with the novel lubrication system. Claims are being made in consumer advertising of long-life, and vibrationless and noiseless operation, because of precision manufacturing methods, including diamond-bored cylinders and bearings, and matched assemblies.

Automatic overload protection has been added to the 9-point temperature control this year.

The two larger models have the four-in-one "Food File" consisting of a series of "food storage drawers" in the bottom of the cabinet; a removable shelf, a tilt shelf, a tray lifter, and one Flexo-tray.

The 4, 5, and 7-cu. ft. models have a tray lifter, and one Flexo-tray. The model with 4.29 net cu. ft. capacity lists at \$128.85; the 5.79-cu. ft. model at \$162.80; and the 6.55-cu. ft. model at \$187.10.

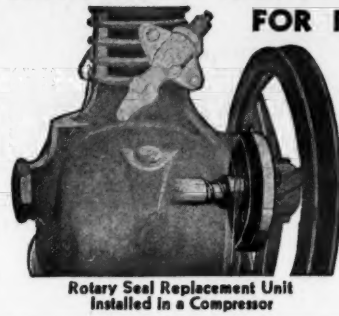
Key Specifications of 1937 Copeland Refrigerators

Model	Capacity (Cu. Ft.)	Shelf Area (Sq. Ft.)	No. of Trays	Ice Cubes	Lbs. of Ice	—Exterior Dimensions— Height Width Depth
437	4.29	9.33	2	56	4½	53½ 23½ 19½
537	5.79	12.15	2	84	6	55½ 27½ 21½
637	6.55	14.53	3	112	8½	58½ 30 22½
737	7.1	15.00	3	98	9	56 30 23
937	9.01	17.4	4	126	11	61½ 32½ 22½

BUYER'S GUIDE

SUPPLIERS WHO SPECIALIZE IN SERVICE TO THE REFRIGERATION AND AIR CONDITIONING INDUSTRIES

ROTARY SEAL REPLACEMENT UNITS FOR REFRIGERATOR COMPRESSORS



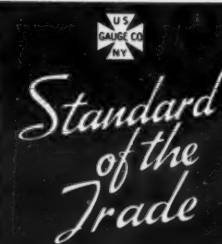
- QUICKLY AND EASILY INSTALLED
- SAVE TIME AND TROUBLE
- PREVENT SHAFT LEAKS

With the many acknowledged advantages ROTARY SEAL UNITS are unquestionable the most perfect replacement seal units available

STRONG, ECONOMICAL, SILENT
GUARANTEED TO GIVE PERFECT SATISFACTION

ROTARY SEAL COMPANY
801 W. Madison St. Chicago, Ill.

U. S. REFRIGERATION THERMOMETERS

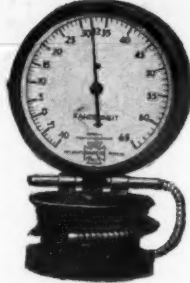


All types of Dial Thermometers for refrigeration service, demonstration and original equipment.

Always ACCURATE . .

RUGGED . .

DEPENDABLE



U. S. GAUGE CO. 44 BEAVER STREET NEW YORK



PURO

ELECTRIC WATER COOLERS

Thoroughly reinforced all steel attractively finished cabinets.

Complete line of different Models and Capacities.

Write for details and sales prices.

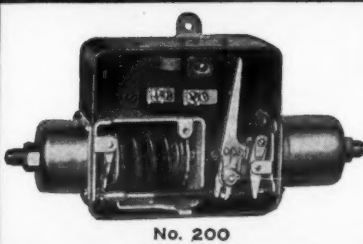
Puro Filter Corporation of America

440 Lafayette Street, New York City

Spring 7-1800

WRITE US FOR BULLETIN AND PRICES

RED SEAL



RED SEAL CONTROLS for Perfect Performance

Sales Agents and Distributors Wanted. Desirable Territory Open.

RED SEAL CONTROLLER COMPANY
1024 SO. FIFTH ST. MILWAUKEE, WIS.

RED SEAL

HENRY DEHYDRATOR



TYPE 718

Large capacity flanged shell dehydrator with tongue-and-groove gasketed union solder fittings. Has dispersion tube. Maximum drying efficiency with minimum pressure drop. Tongue-and-groove fittings can be immediately disconnected permitting quick removal of dryer from line for refilling. 4½" O. D. shell. Write for Catalog 51: Dryers, Strainers, Valves and Service Tools.

HENRY VALVE CO. 1001 19 N. SPAULDING AVE. CHICAGO, ILL.
Stocked By Leading Jobbers

REFRIGERATION PARTS

DOMESTIC · COMMERCIAL
AIR CONDITIONING

100% WHOLESALE

"We protect the Dealer"

Dependable service that enables you to give speedier service—and the lowest prices possible. Deal with "headquarters" for America's largest line. Write for catalog on your letter-head.

Branches: New York—Cleveland—St. Louis.

Send for Our **BIG BARGAIN CATALOG**

THE HARRY ALTER CO.
1728 S. MICHIGAN AVE., CHICAGO, ILL., U.S.A.

THREE WAREHOUSES



LARGE STOCKS
FAST DELIVERY
ENGINEERING ASSISTANCE

MOST COMPLETE LINE OF Refrigeration and Air Conditioning Supplies—Coils—Tubing—Gaskets—Accessory Parts—Valves—Fittings

WILLIAMS & COMPANY, Inc.

CLEVELAND
1748 E. 22nd Street

PITTSBURGH
901 Pennsylvania Avenue

CINCINNATI
Henry & Dunlap Streets

WRITE FOR BULLETINS
DESCRIPTIVE OF VARIOUS
McQUAY PRODUCTS

McQUAY INC.

MINNEAPOLIS MINNESOTA

Watch for **AD**
Announcement

REFRIGERATION NEWS

Established 1926 and Registered U. S. Patent Office as Electric Refrigeration News
Member Audit Bureau of Circulations. Member Associated Business Papers.

VOL. 20, No. 5, SERIAL NO. 411
ISSUED EVERY WEDNESDAY

Entered as second-class
matter Aug. 1, 1927

DETROIT, MICHIGAN, FEBRUARY 3, 1937

Copyright, 1937, by
Business News Pub. Co.

THREE DOLLARS PER YEAR
TEN CENTS PER COPY

Universal Cooler Limits Franchise To One Per City

Standard, Deluxe and Brand Lines Offered; Cabinet Styles Entirely New

DETROIT—A newly designed "15th Anniversary" 1937 household refrigerator line, offered in a "Deluxe" series of 5, 6, and 7-cu. ft. sizes and a "Standard" line of 5 and 6-cu. ft. cabinets, and a new sales policy of limiting dealer franchises to one in each city, was announced last week by Universal Cooler Corp.

Factory-recommended list prices—a departure this year—have been listed as follows on the Deluxe series: "5 Plus"—\$134.95, "6 Plus"—\$149.95, and the "7 Plus"—\$174.95. An all-porcelain "6" sells for \$164.95. The company has not as yet released prices on the Standard line.

In continuing its policy of selling direct to dealers and department stores, Universal Cooler announced that henceforth the line carrying its name will be sold by only one dealer in each city where a franchise is held, but that it will make a brand line (in distinct cabinet design) for sale by a department store located in the same city where the former is sold.

Introduction of several new features (Concluded on Page 4, Column 2)

Alter Named Grunow Sales Director

CHICAGO—Appointment of Harry Alter as director of sales for General Household Utilities Co. was announced Monday by William C. Grunow, president of the organization.

Mr. Alter is head of the Harry Alter Co., Chicago distributor of Grunow products, and of the refrigeration supplies jobbing organization of the same name. He is one of the oldest refrigeration distributors still operating in this city.

Appointment of James J. Davin, former sales promotion manager, as assistant to the president in full charge of sales promotion, was also announced this week by Mr. Grunow.

In his new position, Mr. Davin will control trade paper advertising, propaganda, and act as clearing house for distributors' ideas, so that successful selling plans may be passed from one distributor to others for consideration and use.

F. O. Jordan, Author of 'Air Conditioning Made Easy,' Joins News Staff

F. O. Jordan, author of "Air Conditioning Made Easy," the manual and textbook on air-conditioning engineering practice now being published in serial form in AIR CONDITIONING AND REFRIGERATION NEWS, has joined the editorial department of the NEWS in a full-time capacity, specializing in presenting news and information on air conditioning.

Mr. Jordan makes his first contributions as an editorial staff member in this issue, reporting the proceedings of the technical sessions of the annual meeting of the American Society of Heating and Ventilating Engineers, held last week in St. Louis, which he attended.

For the past two years Mr. Jordan was head of the air conditioning engineering development laboratory for the Airtemp division of Chrysler Motors, which position he left to join the staff of the NEWS.

From 1932 to 1935 he served as air conditioning research and application engineer for Kelvinator Corp. In 1931 and 1932 he was engaged as a sales engineer on ventilating equipment.

In the period from 1927 to 1931 Mr. Jordan was specifications engineer for

2,223,000 Home Units Sold in 1936, Final Figures Show

DETROIT—World sales of household electric refrigerators by manufacturers to distributing outlets during the year 1936 reached a total of 2,223,000 units, according to estimates made by AIR CONDITIONING AND REFRIGERATION NEWS last week upon receipt of reports for the month of December as made by members of the Household Refrigeration Section, Refrigeration Division of National Electrical Manufacturers Association.

The final total of 2,223,000 units exceeds by nearly 40,000 units the guess for the year's total of 2,185,000 units used in the market saturation (Concluded on Page 24, Column 5)

Kelvinator Shuts Down When Strikers Parade

DETROIT, Feb. 2—The Plymouth Road plant of Kelvinator division of Nash-Kelvinator Corp. here shut down this afternoon (Tuesday) after some workers had staged a demonstration, seeking a change in wage policy, during the noon hour.

George Smith, director of industrial relations for Kelvinator, issued the following statement late this afternoon:

"A small minority of Kelvinator employees staged a demonstration by parading through the offices at the noon-hour today, Tuesday. Many other employees wishing to avoid becoming involved in the demonstration did not return to work this afternoon. A reduced force made it impossible to resume operations so that the production lines were shut down."

Newspaper reports said that about 500 workers took part in the demonstration. The Kelvinator plant employs about 6,000 persons.

Ranco Introduces New Commercial Control

COLUMBUS, Ohio—A new stainless steel, corrosion-proof thermostat for pressure and temperature control in commercial refrigeration systems has been placed on the market by Ranco, Inc., of this city.

The unit, Ranco type "KO," is small and compact, requiring a mounting space of only 4 1/16 by 4 1/4 by 1 1/2 inches, and having the electrical rating of 3/4 hp.—12-220 V., a.c.; and 1/2 hp.—115 V., d.c.

(Concluded on Page 2, Column 5)

Important Notice

Subscription Rate of News To be Advanced March 1

The increase in subscription rates to AIR CONDITIONING AND REFRIGERATION NEWS, announced last Fall, will go into effect March 1.

Only until Feb. 28 may new subscriptions be entered, and present subscriptions extended, at the current rate (U. S., Canada, and Pan-American countries—\$3 per year, two years, for \$5; all other countries—\$5 per year). Orders for subscriptions at these rates will be accepted only if postmarked not later than Feb. 28, 1937.

Because of rising costs in the production and the enlarged scope and increasing content of the editorial services being rendered, the subscription rate to AIR CONDITIONING AND REFRIGERATION NEWS will be increased to \$4 per year on March 1.

This new rate of \$4 will apply to United States and Possessions, Canada, and the Pan-American Postal Union Countries (Spain, Newfoundland, Central, and South American Countries). To all other countries, the subscription rate will be \$6 per year.

Carbondale Develops Self-Contained Air Conditioner Line

HARRISON, N. J.—A new line of unit air conditioners with a wide range of air and refrigerating capacities has been announced by the Carbondale Division of Worthington Pump and Machinery Corp. here.

Unusual feature of this line is the fact that it is built up of "separable sections," which is to say that each unit is composed of several separate sections which may be shipped and handled separately.

One section contains the complete fan assembly together with motor; another section comprises the complete coil and humidifier assembly; while another assembly forms the base and contains the air-cleaning elements.

Each section is complete, consisting of the necessary framework, enclosing panels, and air-conditioning elements.

This separable or sectionalized arrangement facilitates not only the shipping and handling of the unit, but is of assistance in the work of installation work as well because of the fact that the different sections may be mounted in place one by one.

Another feature which is of special interest, particularly to the service man, is the exceptional accessibility of all parts. The motor, the drive, the filters, and all bearings are accessible (Concluded on Page 21, Column 1)

Jewett Introduces One-Model Line

BUFFALO—Model 80, Jewett Refrigerator Co.'s latest contribution to the household refrigeration field, was introduced at the recent House Furnishings Show in Chicago. Jewett's 1937 domestic refrigerator production will be restricted to this single 8-cu. ft. model.

Principal feature of Model 80 is a 2-cu. ft. humidified vegetable compartment which operates at a temperature of 45° F. with a relative humidity as great as 90%, according to claims made by company engineers. Tests indicate that vegetables placed in this compartment for a period of ten days show as little as 2% shrinkage in weight, say engineers. Refrigeration in this compartment is achieved through conduction.

The new Jewett also features a 1-cu. ft. cold storage compartment operating at a temperature of 15° F. This space can be used entirely for (Concluded on Page 2, Column 3)

Crosley Officials Hope to Resume Production This Week; Servel's Plants Already Back in Operation

Sunbeam Also Back to Normal As Flood Waters Leave

EVANSVILLE, Ind., Feb. 2—The plant operated here by Servel, Inc., manufacturer of Electrolux gas-operated household refrigerators, and Servel commercial refrigeration and air-conditioning units, went back into regular production today (Tuesday), announced Servel President Louis Ruthenburg, as this city was returning to normal after a 10-day battle with flood waters.

The flood waters at no time reached the Servel plant, and no damage whatsoever has been suffered by the Servel properties, said Mr. Ruthenburg, who remained here all during the flood crisis.

The plant had been thrown out of operation for a week only because it was difficult for the workers to reach the plant and because many were engaged in flood-relief work, and because there was a curtailment of the water supply for five days.

Shipments of Servel products were made from the warehouse stock all throughout the flood period, the C. & E. I. railroad maintaining freight traffic, declared Mr. Ruthenburg.

The industrial district here was virtually untouched by the flood, said Mr. Ruthenburg, and all the large plants—including Sunbeam Electric Mfg. Co., which makes the Sears, Roebuck "Coldspot" refrigerator; and the Hoosier Lamp & Stamping Co., which makes various parts for electric refrigerators—had swung back into full-time operation today. The water works had resumed operation, and the other utilities had never gone out of commission.

Flood waters were receding rapidly after reaching a crest Sunday, and citizens of Evansville who had been forced to flee the flood waters were returning to their homes. The Servel recreation building had been turned over to refugees, but all had left by Tuesday, said Mr. Ruthenburg.

Biological & Social Problems Discussed At ASHVE Sessions

ST. LOUIS—Application of air conditioning to physiological problems, and the need for engineers who recognize the social and economic aspects of their work, were problems stressed at the 43rd annual meeting of the American Society of Heating and Ventilating Engineers held here Jan. 25-27 at the Hotel Statler.

A paper on "Cooling Requirements for Summer Comfort Air Conditioning" (see page 15) was presented (Concluded on Page 28, Column 3)

Kelvinator Expands Commercial Division; Factory Crews Take '37 Plans Into Field

DETROIT—The more than 100 members of the Commercial Refrigeration Division of Nash-Kelvinator Corp. executive staff galvanized into action last week on the first leg of a six-weeks series of meetings, in every corner of the country, which will bring Kelvinator's commercial and air-conditioning products and sales plans for 1937 to its distributors and dealers.

A culmination of three years of planning by Commercial Manager J. A. Harlan, these field conferences are believed by Mr. Harlan to be the most ambitious program of its type ever undertaken by any commercial refrigeration manufacturer.

Since the commercial division was made autonomous last year, and since many of its distributors do not (Concluded on Page 28, Column 1)

Crosley Workers Rush to Refit Plant by Time Power Is Restored

CINCINNATI, Feb. 2—Maintenance crews of the Crosley Radio Corp. are working ahead with all possible haste to get the plant ready for resumption of production operations when electric power and water facilities are restored, possibly by the end of this week.

The river is going down at a rapid rate and no water remains in the Crosley factories, company officials declare. The main plant, in which the units for Crosley refrigerators are made, was not damaged by the fire which destroyed the cabinet assembly plant.

Electric service is being restored as rapidly as possible, and it is thought that lighting and power connections will be completed and service available at the Crosley plants no later than the week-end.

As told in last week's issue of AIR CONDITIONING AND REFRIGERATION NEWS, Crosley will get cabinets from the Rex Mfg. Co. at Connersville, Ind., which has supplied many of the Crosley cabinets in the past, and if necessary will draw upon the Truscon Steel Co. at Cleveland, which has the dies for forming of the metal parts for the cabinets, and which can commence assembly of Crosley cabinets at once.

Philadelphia Sales Up 28% in 1936

PHILADELPHIA—Sales of household electric refrigerators in the Philadelphia metropolitan area during 1936 totaled 63,804 units—an increase of 28% over the 49,768 sold during 1935, according to figures reported by George R. Conover, managing director of the Electric Association of Philadelphia.

Figures for the final quarter of the year showed a 3,043 unit increase over those for the corresponding period of 1935. December sales of 3,714 units were 55% higher than that month's figure for 1935, which was 2,362. An even greater percentage of increase was shown in the November figures, in which sales of 3,165 units represented a 72% gain.

Representing an increase of 22%, retail value of 1936 sales was \$11,058,104, compared with a retail value of \$9,042,575 in 1935. Average unit price of the refrigerators sold during the past year was \$173; that for 1935 was \$181.

Philadelphia Electric Co.'s sales represented 7.5% of the total sales made in the area during 1936, the report shows. With 4,793 unit sales, (Concluded on Page 6, Column 1)

653 Westinghouse Units Installed in Chicago Housing Project

CHICAGO — Six hundred and twenty-three 4 cu. ft. Westinghouse electric refrigerators have been installed in the Marshall Field Garden Apartments, the model housing section maintained by the late department store magnate's estate on Chicago's near north side.

The sale was made by H. A. Malcom, manager of the refrigeration department of the Chicago branch of Westinghouse Electric Supply Co. The refrigerators sold were 1936 models.

Erected several years ago as a model housing project, the apartments now house more than 2,200 people, and offer several services not usually associated with structures of this kind.

Education for children of tenants, from kindergarden through third grade, is provided at a cost of \$55 a year. The children start to school at the age of 4 years. During this period, supervised playground service also is provided, outdoors in summer, and indoors in winter.

An auditorium is available to tenants for bridge clubs and parties. The men of the families may also follow their favorite hobbies in a workshop in the basement, where woodworking and other equipment is available. A drama club, choral club, and men's bowling team is also maintained in the buildings.

At the time the refrigerators were delivered, there were but two vacancies in the 623 apartments in the group.

Has Reason to Smile



M. S. Bandoli, in his first year as salesmanager of the Kelvinator domestic refrigerator division, is cheered by a big pile of orders following national convention.

Kelvinator Shipments Up 29% in First Quarter

DETROIT—An increase of 29.8% in total shipments of Kelvinator refrigeration products for the first three months of the fiscal year commencing Oct. 1 was reported last week by Henry W. Burritt, vice president in charge of sales.

Unit shipments of Kelvinator refrigeration products during the period were 53,607, as compared with 41,270 for corresponding period last year.

J. A. Harlan, manager of commercial sales, announced that shipments of Kelvinator commercial refrigeration units for December were 47.5% higher than in December, 1935.

High Humidity Space Featured in Jewett 1937 Refrigerator

(Concluded from Page 1, Column 3) making frozen desserts or the preservation of frozen fish and game, or the space may be used to freeze 336 ice cubes, or 17 pounds of ice. This compartment is regularly equipped with four metal ice trays, one patented rubber tray, and one deep dessert tray. The freezing coil is directly against the bottom of the compartment, separated only by one sheet of copper.

An aluminum tray directly beneath the freezing coils extends the full width and depth of the cabinet. It may be used for holding steaks, chops, or extra ice cubes. This tray can be withdrawn almost its entire length to be used as a sorting or rearranging tray.

Eighteen square feet of shelf area is available in the 6-cu. ft. main storage compartment. Six glass covered jars are mounted on a separate, revolving tray so that they may be easily reached. Model 80 has all the conventional gadgets such as a built-in thermometer, an automatic light, and a defrosting switch.

The cabinet is finished in Dulux, and insulated with 3 inches of Thermocraft. This insulation is wrapped in three-ply laminated and waterproofed paper. A moulded hard rubber bead surrounds the two compartments. Doors are equipped with rubber balloon-type gaskets. Porcelain lining extends flush to the door. The vegetable compartment door is held under constant pressure by two

New Apex Executive



R. E. Kortepeter was brought in from the Pacific Coast to head Apex's refrigeration department.

rods in chromium housings. Coil springs, sealed in oil, maintain this pressure. Exterior measurements of the cabinet are: height, 60 inches; width, 29 1/4 inches; depth, 22 inches.

Model 80 has a direct-drive condensing unit. The one-cylinder compressor is powered by a 1/4-hp. capacitor-start induction-run motor. The condenser is of the single pass, single row type, with a radiating surface of 8 sq. ft. The copper receiver is made of drawn, seamless tubing. Methyl chloride is used as refrigerant. Overall dimensions of the condensing unit are: height, 10 inches; width, 11 1/4 inches; length, 13 1/2 inches.

In addition to the standard one-year warranty on the Jewett Model 80, the company agrees to a non-transferable four-year replacement contract. This contract states that the Jewett Refrigerator Co. will replace at the factory the whole or any part of the sealed-in mechanism in which defects in material or workmanship appear.

This contract is valid only if the refrigerator remains in the hands of the original purchaser, and if the defects appear under normal service during the four years immediately following expiration of the one-year warranty.

Zamoiski Expands Offices & Showrooms in Baltimore

BALTIMORE — The Joseph M. Zamoiski Co., Baltimore distributor for Norge products, has expanded its office and showroom facilities by procuring additional floor space in its present building at Pratt & Paca Sts.

With the additional space, the company now has a total of 22,000 sq. ft. of floor area, housing new offices, sales, and showrooms. In addition, the new quarters contain a separate sales and showroom for Norge oil burners. Warehousing facilities have been doubled by the expansion.

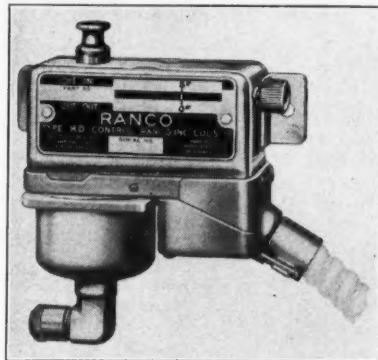
New Ranco Control Has Wide Range

(Concluded from Page 1, Column 2)

Company engineers claim this high rating is made possible because of the wide break which occurs when the overload trips or when the manual switch is operated—and because of heavy contact pressures and liberal contact surfaces of fine silver.

The temperature differential ranges from 4° to 20° F. The low pressure differential ranges from 4 to 30 lbs. The high pressure differential of 30 lbs. is non-adjustable.

The low-pressure cutout has a range of 20 to 40 lbs.; the high pressure, 110 to 200 lbs. For the temperature cutout, ranges of —15° to 20°, 0° to 35°, and 25° to 55° are available. The range calibration indicator is



Ranco's new commercial control.

visible through a window covered with transparent material which excludes dust.

Both range and differential are adjustable from outside of switch.

Low-pressure and temperature controls normally are circuit-closing at high pressures and temperatures, but may be constructed to open the circuit on high pressures and temperatures. The high pressure cutout is circuit-opening on high pressures.

The Ranco control mounts in any position with accessibility provided by easily removable snap-locking side covers. The knife edges of all toggle bearings are machined.

Rotatable power elements on all pressure-type controls simplifies tube connections. If desired, the angle fitting may be turned to point directly into the tube.

Fairbanks-Morse Appoints Special Representatives

INDIANAPOLIS—Appointment of J. H. Hopwood, R. E. Eshman, W. H. Hayward, and D. B. Keller as special representatives of the home appliance division of Fairbanks, Morse & Co., was announced last week by General Manager W. Paul Jones.

The men will work with distributors and dealers, assisting them in their sales plans and in adapting the company's national promotion and advertising program to local conditions.

Mr. J. D. McLeod
General Sales Manager
Copeland Refrigeration Corp.,
Detroit, Mich.

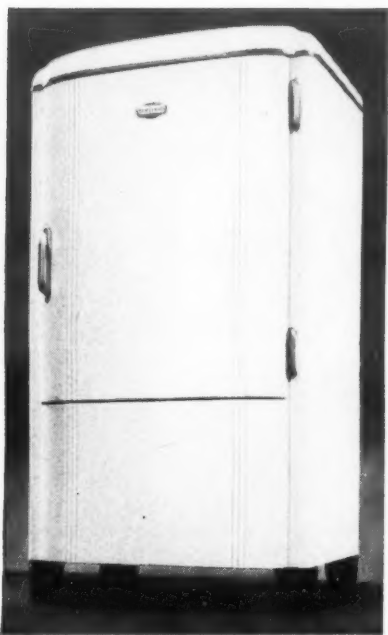
Dear Mr. McLeod:

What outlay of money is necessary to take on the Copeland line, and to stock, say, one each of your various models?

I would like very much to handle Copelands, but if it requires very much cash or a sizeable balance sheet, I am not in position just now to do so.

In Chicago at the show I heard that you have a new finance plan which does not require nearly so "stiff" a statement as the finance companies have insisted upon in the past, and if this is true, I am very anxious to

48 Hours later this man became a Copeland Dealer



• You don't need a big bankroll to handle the 1937 Copeland line of refrigerators.

Our new floor financing plan attaches far greater importance to your personal reputation than to the "net worth" figure on your balance sheet.

And so we invite letters, such as the one above, from reputable dealers everywhere—from dealers who want to grow with Copeland.

New discounts, a big national and local advertising program and a new and bigger line of strikingly beautiful models, each refrigerated by the famous Copeland twin-cylinder compressor, are attracting scores of new dealers to Copeland these days.

To learn what Copeland will do for you—how Copeland will help you make profits, write TODAY to J. D. McLeod, General Sales Manager, Copeland Refrigeration Corp., Detroit, Michigan.

There are substantial profits, too, for commercial refrigeration dealers in the sales of Copeland Commercial Heavy-Duty Refrigeration Units, thousands of which are purchased annually by restaurants, soda fountains, dairies, hotels, markets, hospitals.

COPELAND

REFRIGERATION CORPORATION, DETROIT, MICH.

A DALLAS E. WINSLOW INDUSTRY

PIONEER MANUFACTURERS OF REFRIGERATION

Porcelain enamel makes bigger profits possible

Porcelain enamel makes satisfied customers

Porcelain enamel is by far the safest, most dependable, most profitable finish to both those who make and sell, and those who buy and use

PORCELAIN ENAMEL INSTITUTE, INC.
612 NORTH MICHIGAN AVENUE • CHICAGO



HERE'S ANOTHER ENDORSEMENT OF

Kelvinator's **great 1937 program!**

**ORDERS FOR KELVINATOR REFRIGERATORS IN 1937 HAVE
ALREADY SHATTERED ALL PREVIOUS RECORDS!**

**THE FINEST LINE
OF REFRIGERATORS
KELVINATOR
HAS EVER BUILT**



That's how the field organization feels about the great Kelvinator programs for 1937.

Right down the line—distributors, dealers and salesmen—are more enthusiastic than they have ever been before at the start of a selling season. They are enthusiastic about the new product, the advertising, the promotion, and the selling story.

And they voiced this enthusiasm with *orders*—orders far in excess of those ever turned in, in previous years, following the announcement of a program.

KELVINATOR, Division of Nash-Kelvinator Corporation, Detroit, Michigan

**PROMOTION
THAT GUARANTEES
FLOOR TRAFFIC**

**THE LARGEST NATIONAL
ADVERTISING
CAMPAIGN IN
KELVINATOR'S HISTORY**

**COAST-TO-COAST
RADIO
CAMPAIGN**

**THE MOST CONVINCING
SELLING STORY EVER
PUT BEHIND
A REFRIGERATOR**

1937 will be the greatest year in history for
Kelvinator Dealers

Kelvinator Realigns Commercial Staff

(Concluded from Page 1, Column 5)
Reinach has been appointed sales manager, and W. E. Watson, assistant sales manager of this department.

Because of the close association between automatic heating and residential air conditioning, the residential air conditioning and automatic heating department has been established. E. L. Sylvester has been made sales manager of this unit.

Since his association with Kelvinator, a year ago, Mr. Sylvester has been active in the development of the Kelvin Home program. In addition to his duties with the new division, he will continue to be director of Kelvin Home.

L. G. Estep, identified with Kelvinator research and engineering activities and with the development of the Kelvin Home field test program, has been appointed assistant sales manager in charge of residential air conditioning for the new department.

B. M. Hanley will be assistant sales manager in charge of automatic heating.

Combustioneer Names Prior Sales Head

SPRINGFIELD, Ohio—H. W. Prior has been appointed domestic sales manager of Combustioneer Automatic Coal Burners.

Mr. Prior gained his early business experience with National Cash Register Co. Then he joined the Delco organization, eventually becoming sales manager. Later he dropped this work to join the sales department of Frigidaire.

'Down-Draft' Cooling in Evaporators Featured By Universal Cooler

(Concluded from Page 1, Column 1)
tures and gracefully rounded modernistic cabinet design and rounded top, characterizes the new Deluxe models. All cabinets are wider and fairly shallow with an increase in height which reduces floor space occupied. The 7-cu. ft. model in the Deluxe range occupies the same floor area as does the 6-cu. ft. cabinet. A center beading, running the full length of the door, characterizes the Deluxe series. Nameplates are finished in blue this year and are located at the left top side of the door. The standard line has a square design, and stylish cabinet.

Freon refrigerant is used in all compressors. Down-draft "double" cooling evaporators, featured in last year's line, has been continued in the 1937 models. With this evaporator, there is no accumulation of frost on the cooler.

Compressors are of the single-cylinder type, provided with Universal Cooler cross-lapped piston rings. Minor refinements have been made in compressor design.

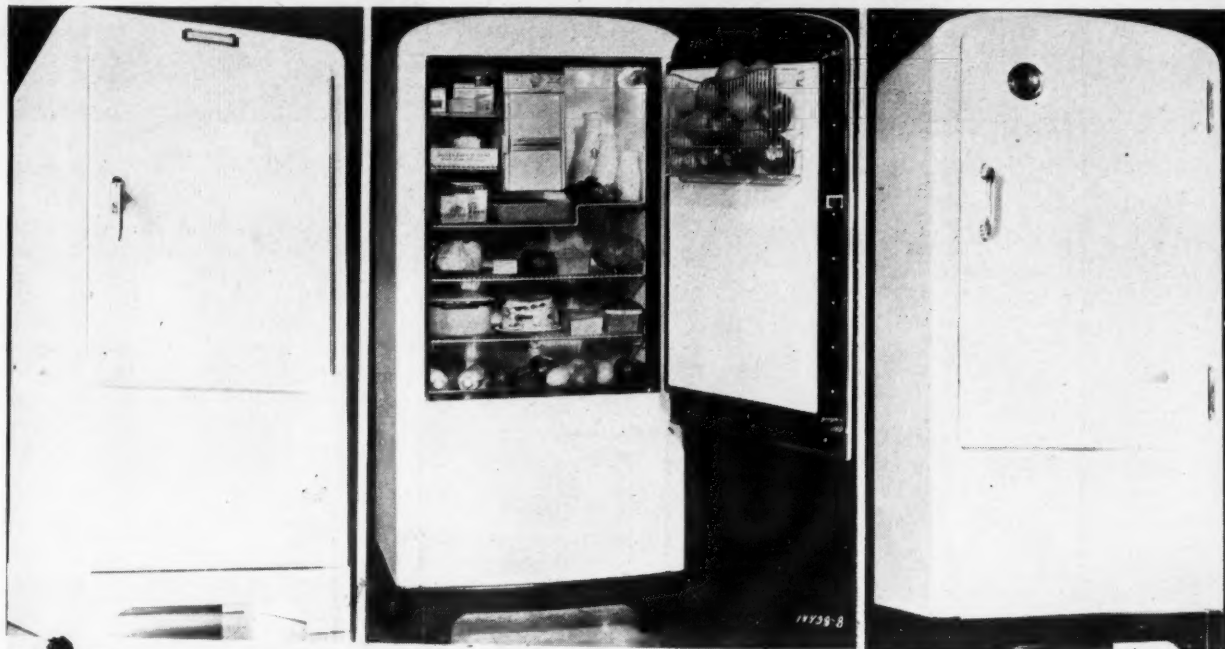
In the Deluxe line, cabinets are of hermetic steel construction on which scientific leak tests have shown maximum sealing. Exteriors are baked lacquer under which are two baked priming coats and a bonderized finish on steel. Interiors are of acid-resisting porcelain.

A 16-point temperature control featuring the new "Tell-Tale" dial is presented this year. This control has three ranges marked "Moderate," "Normal," and "Colder" for easier

reading and setting by housewives. A thermometer is also provided.

In the Deluxe 6 cu. ft. and 7-cu. ft. boxes, trays provide 106 ice cubes totaling 11 lbs. of ice, while in the 5-cu. ft. model 8 lbs. of ice in 78 cubes may be made. Both Standard series boxes have 84-cube capacity. Super-fast freezing coils are built in above and below each tray space. One rubber tray grid is standard in each Deluxe model. Retained are the "Cocktail" trays which makes smaller cubes for use in cold drinks.

Universal Cooler's Standard and Deluxe Models



Left: Exterior of Standard model. Center: Interior of Deluxe model. Right: Exterior of 1937 Deluxe model.

Standard accessories and features include a "Natural Action" door handle operated by a thumb release; automatic interior light turning on and off with the opening and closing of the door and provided with a jade shade; jade-colored defrosting tray, rubber grid, and Crisperator; a tray lifter, and double-depth freezing space.

A "Handy Door" wire basket arrangement which may be used for holding fruit and extra canned goods has been introduced this year. This new feature provides space for six 12-oz. bottles or 12 12-oz. cans of tomato juice or similar articles.

Cabinet dimensions of the Deluxe line are as follows: "5 Plus"—5.236 cu. ft., 11.26 sq. ft. shelf area, 27% in. wide, 25²³/₃₂ in. deep overall, 55 in. high; "6 Plus"—6.516 cu. ft., 13.23 sq. ft. shelf area, 30 1/4 in. wide, 25¹⁹/₃₂ in. deep overall, 58¹⁵/₁₆ in. high; "7 Plus"—7.46 cu. ft., 14.43 sq. ft. shelf area, 30 1/4 in. wide, 25¹⁹/₃₂ in. deep overall, 63 1/4 in. high.

On the standard line, cabinet dimensions are: 5-cu. ft. model—5.23 cu. ft., 11.26 sq. ft. shelf area, 22% in. wide, 25 1/4 in. deep overall, 54 1/2 in. high; 6-cu. ft. model—6.21 cu. ft., 12 sq. ft. shelf area, 29 1/4 in. wide, 25 1/4 in. deep overall, 57 1/4 in. high.

Announcement of Universal Cooler's new merchandising set-up which includes zone and regional representatives who will contact retailers this year is as follows:

West Central Zone—Don Mason, zone manager, Chicago. Assistants: Hill & Hedquist Co., Minneapolis; E. J. Stewart, Chicago; and Lynn Stewart, Evanston, Ill.

Central States Zone—J. E. Brennan, zone manager, Detroit. Assistants: Lawrence Anderson, Sydney, Ohio; Albert E. Middleman, Pittsburgh; Warren Brennan, Detroit; Albert Rapfogel, Cleveland; W. D. Jackson, Cincinnati; Edward Fairchild, Syracuse, N. Y.; Harry Lever, Atlanta.

Southwest Zone—Harry Thompson, Phoenix, Ariz.

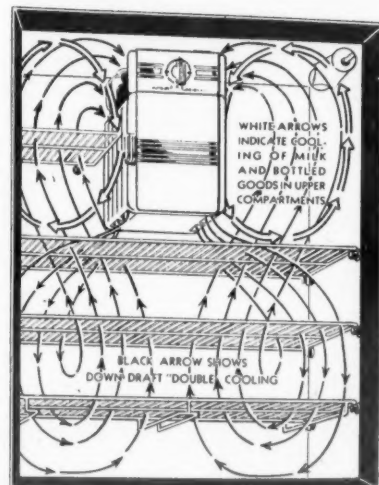
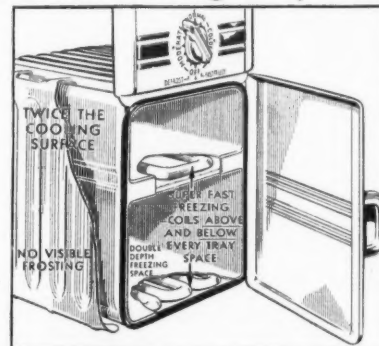
Missouri, Iowa, and Nebraska—Brickman-Saizow Co., Kansas City.

Pacific Coast Zone—Dwight E. Morris, zone manager, Portland, Ore.

Atlantic Coast Zone—Harry S. Gould, zone manager, Boston.

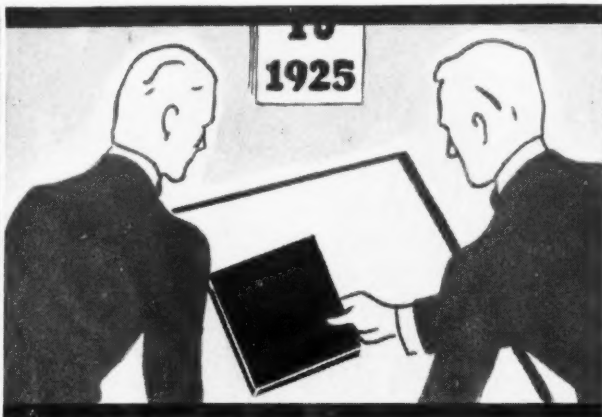
Universal Cooler's sales plans for the coming year were outlined to these men at a conclave in Detroit last week-end. Among those who talked to the district representatives at this meeting were F. S. McNeal, president; H. A. D'Arcy, domestic sales manager; George Moister, advertising manager; W. W. Higham, chief engineer; H. L. Morrison, service manager; C. E. Costain, treasurer; and John E. Higgins of Commercial Credit Co., who outlined the dealer floor plan, and retail financing plan which will be available to Universal Cooler dealers this year.

Double-Cooling Evaporator



Drawing at the top illustrates the construction of the Universal Cooler evaporator. Bottom drawing shows how air circulation is said to be accomplished in this unit.

FIRST IN 1925



FIRST IN 1937



—Balsam-Wool Fibre Slabs

FIRST- Wood Conversion Company was the first manufacturer to develop a low density package insulation for refrigerators. The Balsam-Wool Sealed Slab package was introduced as early as 1925—before the advent of modern domestic refrigeration.

FIRST- Wood Conversion Company was the first to bring out a special packaging machine which completely fabricates the sealed slab in the plant of the refrigerator manufacturer... the first to offer the refrigerator manufacturer a substantial saving in overhead by the use of licensed machines in his own plant.

FIRST- Wood Conversion Company was the first to offer—in Balsam-Wool Fibre Slabs—an insulation that has everything—high efficiency—protection from moisture—non-settling, clean and economical.

FIRST- Proved in hundreds of thousands of refrigerators, Balsam-Wool Fibre Slabs stand first in preference among refrigerator manufacturers. The volume of Balsam-Wool Fibre Slabs used for domestic refrigerators is today greater than that of any other insulation.

WOOD CONVERSION COMPANY
Refrigeration Sales Division... 360 North Michigan Avenue, CHICAGO, ILLINOIS
ST. PAUL, MINN. NEW YORK, N. Y.

BALSAM-WOOL
FIBRE SLABS
PRODUCT OF WEYERHAEUSER

Three Reasons Why

AERO SELF-ALIGNING SEALS



SELL FASTER

1 - LIST PRICE \$1.50

2 - LIBERAL TRADE DISCOUNTS

3 - FULLY GUARANTEED

They Seat and Seal Immediately!
"THE LONGER THE WEAR - THE BETTER THE SEAL"

COVERED BY U.S. PATENT
2,067,540
OTHER PATENTS PENDING

AERO PRODUCTS CORPORATION
36-08-34th St., Long Island City, New York

NOW ON THE
5th MILLION



FRIGIDAIRE SHATTERS ALL RECORDS AND PUTS ON *MORE* SPEED FOR 1937!

Over 4,000,000 Frigidaires Have Been Sold – 500,000 in 1936 Alone

... and you'll do **STILL BETTER** with Frigidaire in 1937—BECAUSE, **1.** You'll have a Sensational New Product—designed from top to bottom with startling new features—including one that will instantly capture the imagination of the buying public, and start dealers talking from coast to coast! **2.** You'll have an unbeatable New Selling Strategy! **3.** You'll have Millions More Advertising Messages working for you—every one packed with new selling power... more dramatic, more appealing, more action-compelling than ever! With this potent program, Frigidaire is putting on **MORE SPEED** for 1937. And Frigidaire Dealers are preparing for another and even greater record-shattering year!

FRIGIDAIRE DIVISION • GENERAL MOTORS SALES CORPORATION • DAYTON, OHIO

YOU'LL DO STILL BETTER WITH FRIGIDAIRE IN '37!

Philadelphia Dealers Sell 63,804 Household Refrigerators During 1936 at Average Price of \$173

Month	1936 Units Sold	1935 Units Sold	1934 Units Sold	1936 % Inc. or Decrease over 1935	1936 Retail Value	1935 Retail Value	1936 % Inc. or Decrease over 1935	1936 Average Price	1935 Average Price
January	2,532	718	1,069	+252%	\$ 456,989	\$ 137,553	+232%	\$181	\$191
February	3,657	2,634	1,329	+39%	681,667	488,489	+39%	186	185
March	7,668	6,357	3,363	+21%	1,349,089	1,115,435	+21%	176	175
April	9,870	6,652	8,290	+48%	1,718,797	1,176,865	+46%	174	177
May	9,911	7,885	8,754	+25%	1,719,936	1,390,673	+24%	173	176
June	6,641	5,936	6,738	+12%	1,108,942	1,037,659	+7%	167	175
July	6,409	6,290	4,775	+2%	1,113,894	1,147,967	-3%	174	182
August	3,851	4,085	2,683	-3%	653,911	754,558	-14%	166	187
September	3,591	2,730	1,593	+31%	633,889	542,075	+17%	176	198
October	2,695	2,330	1,767	+15%	484,065	426,465	+14%	168	183
November	3,165	1,839	1,002	+72%	508,333	342,874	+48%	161	186
December	3,714	2,362	1,085	+55%	659,092	481,826	+36%	177	204
Totals	63,804	49,768	42,445	+28%	\$11,058,104	\$9,042,575	+22%	\$173	\$181

Sales by Philadelphia Utility Fail to Show as Large Gain

Month	1936 Units Sold	1935 Units Sold	1934 Units Sold	1936 % Inc. or Decrease over 1935	1936 Retail Value	1935 Retail Value	1936 % Inc. or Decrease over 1935	1936 Average Price	1935 Average Price
January	81	53	117	+53%	\$ 16,718	\$ 10,923	+53%	\$206	\$206
February	160	104	103	+54%	29,623	18,383	+61%	185	176
March	372	302	231	+23%	70,191	57,386	+22%	188	190
April	810	566	726	+43%	152,348	105,182	+44%	188	186
May	867	719	795	+20%	163,068	130,465	+24%	188	181
June	768	715	589	+7%	143,474	134,389	+6%	186	188
July	625	685	554	-9%	117,088	133,640	-13%	187	195
August	426	513	353	-17%	81,241	102,322	-21%	190	199
September	297	263	184	+12%	56,933	52,649	+8%	191	200
October	133	122	96	+9%	28,005	26,703	+5%	210	218
November	126	113	91	+11%	22,715	23,888	-5%	180	211
December	128	108	95	+18%	28,548	22,483	+27%	184	208
Totals	4,793	4,263	3,934	+12%	\$904,892	\$818,413	+10%	\$188	\$192

Note: Utility sales approximate 7.5% of total sales. Report covers sales in Philadelphia, Bucks, Montgomery, Delaware, and Chester Counties. Report includes sales of the following makes: Apex, Coldspot, Crosley, Frigidaire, Copeland, General Electric, Grunow, Hot Point, Kelvinator, Leonard, Norge, Sparton, Stewart-Warner, Universal, and Westinghouse.

Philadelphia Utility Sales Price Averages \$188

(Concluded from Page 1, Column 5) the utility bettered its 1935 figure of 4,263 by 12%.

Retail value of the utility's sales for 1936 amounted to \$904,892—a

10% increase over the previous year's total of \$818,413. The average retail price of units sold by the electric company was \$188 in 1936, while in the preceding year it was \$192.

Sales by the utility for the final quarter of the year also showed an increase over those for that period in 1935. Comparing by percentage of

increase, December was high-sales month for the quarter, with 128 units, a gain of 18% over the sale of 108 units in that month of 1935.

In November, Philadelphia Electric Co. sold 126 units to top that month's figure for the preceding year by 11%. October sales of 133 units were 9% ahead of those made in 1935.

At Brunner Sales Meeting



These Brunner executives and sales representatives mapped out an intensive sales campaign at their annual meeting at the Blackstone hotel, Chicago, recently. Those present were: (front row, left to right) Canadian Representative A. H. Fraser, Toronto; Asst. Chief Engineer O. H. Buschmann, Chief Engineer H. E. Thompson, President G. L. Brunner, Salesmanager B. J. Scholl, Asst. Salesmanager J. W. Thomas, and G. L. Brunner, Jr., sales department, all of Utica, N. Y.

Second row: District Representatives J. B. Fleming, Baltimore; J. J. Burke, New York City; C. E. Burlingame, New York State; R. C. Smith, Dallas; G. W. Chandler, Philadelphia; W. M. Cashin, Boston; H. H. Valpey, Cincinnati.

Third row: Advertising Representative A. F. Vars, Buffalo; and District Representatives L. A. DeMarsh, Kansas City; B. H. Kaple, Atlanta; W. D. Rockwell, Detroit; Jeff Reid, Des Moines; S. W. Hanna, Cleveland; and J. P. Junkin, Minneapolis.

- DISTRIBUTOR MEETINGS -

Westinghouse Displayed In Theatrical Setting

INDIANAPOLIS — A carload of theatrical properties sent directly from the factory at Mansfield were used by local branch of Westinghouse Electric Supply Corp. in presenting the new line of Westinghouse appliances to more than 200 dealers from Indiana and eastern Illinois on Jan. 11 at Hotel Antlers here.

Roy L. Brown, division manager of the company's Indiana district was in charge of the showing. A formal conference preceded the noon luncheon, and informal group discussions were held in the afternoon.

Others who participated in the presentation were: J. C. Schmidbauer, district manager for the supply company; C. A. Dostal, district merchandising manager; C. G. Lammers, assistant merchandising manager; R. M. Beatty, sales promotion manager; and H. M. Butzloff, district refrigeration supervisor; all of Chicago.

Frank S. Howard, Marion county supervisor of ranges and refrigerators; Roy V. Mowe, range and refrigerator supervisor for the eastern Indiana; Richard J. Sargent, supervisor for western Indiana; R. T. Rogers, supervisor for manufacturing sales in Indiana.

Electrolux & Leonard Men Address Sutton Dealers

CHARLOTTE, N. C.—A. K. Sutton Corp., electric appliance distributor in this territory, recently sponsored a one-day convention here which was attended by 350 dealers handling Leonard and Electrolux refrigerators and Easy washers and ironers.

A business session at the distributor's headquarters was followed by presentation of the various lines at the Hotel Charlotte. Dinner and evening entertainment closed the convention. A. K. Sutton, head of the distributorship, and E. S. Whitlock, sales manager, directed the program.

Factory representatives at the meeting included: R. I. Petrie, Leonard general sales manager; George W. Gray, Leonard southern division sales manager; William McAllister, Leonard southern division merchandising manager; Roderic Peters, Electrolux eastern division sales manager; W. E. Mahoney, Electrolux southern division sales manager; James Clarke, Electrolux southern division merchandising manager; J. A. Gazelle, Easy southern division sales manager; and W. H. Mulhall, Easy southern division merchandising manager.

Commenting favorably on sharp sales increases experienced by his company recently, Mr. Sutton announced acquisition of larger quarters.

Malone & Moles Display Lines At Dealer Meeting

SIOUX CITY, Iowa—Dealers from sections of Iowa, Nebraska, and South Dakota met here recently when Malone & Moles Co., local appliance distributor, displayed 1937 lines of Electrolux refrigerators, Pelco beverage coolers, and Majestic radios.

Lewie Sessions, Evansville, Ind., represented Servel, Inc., at the showing. Portable Elevator Mfg. Co. sent A. J. Kernan to represent Pelco.

Officers of Malone & Moles reported that the company's volume of business for 1936 showed an increase of 23% over that of the previous year.

1000 Frigidaire Dealers See Line at Cleveland

CLEVELAND — More than 1,000 Frigidaire dealers and salesmen in the Cleveland territory viewed the 1937 Frigidaire line, and had sales promotional and advertising plans for the year outlined for them at a one-day sales conference held at the Masonic Auditorium here Jan. 27.

H. H. Kennedy, district manager for Frigidaire in the Cleveland area, presided at the one-day meeting. Executives and factory representatives from Dayton who conducted the program included: Frank E. Pierce, household division manager, H. L. Maltern, assistant household sales manager, R. E. Smithson, commercial division manager, D. T. Hayward, zone manager, C. E. Quigley, commercial division, A. D. Farrell, H. T. Shannon, S. C. White, and Jack Mitzelfelt of the sales promotion division, and George Dunbar and J. S. Morgan of the utility division.

Norge Executives Attend Salt Lake Meeting

SALT LAKE CITY—More than 60 Norge distributors and dealers of Utah, Montana, and Colorado were guests of Salt Lake Hardware Co. at a three-day meeting held in the local distributor's sales auditorium.

Among Norge executives who participated in the convention were: John H. Knapp, vice president in charge of sales; R. E. Densmore, general field manager; James A. Sterling, advertising and merchandising manager; J. R. Cameron and R. S. Beale, members of the Norge sales organization; Earle Bridge, sales manager of Norge's washer division.

A. L. Kitson, factory specialist in kitchen ranges; Walter Sailer, Milwaukee, president of Cramer-Krasselt Co., Norge advertising representative; and W. H. Crawford, Baltimore, vice president of Commercial Credit Co., Norge finance agency.

200 Oklahoma Dealers View Westinghouse Lines

OKLAHOMA CITY—The 1937 lines of Westinghouse electric appliances were shown to 200 Oklahoma dealers meeting Jan. 18 at the Huckins hotel here, according to E. J. Schaubert, Oklahoma branch manager.

Executives here for the meeting included R. E. Imhoff, general sales manager in the merchandising division; B. J. Clark, vice president; and J. E. Mooney, St. Louis regional sales manager.

Graybar Shows Kelvinator Line to St. Louis Dealers

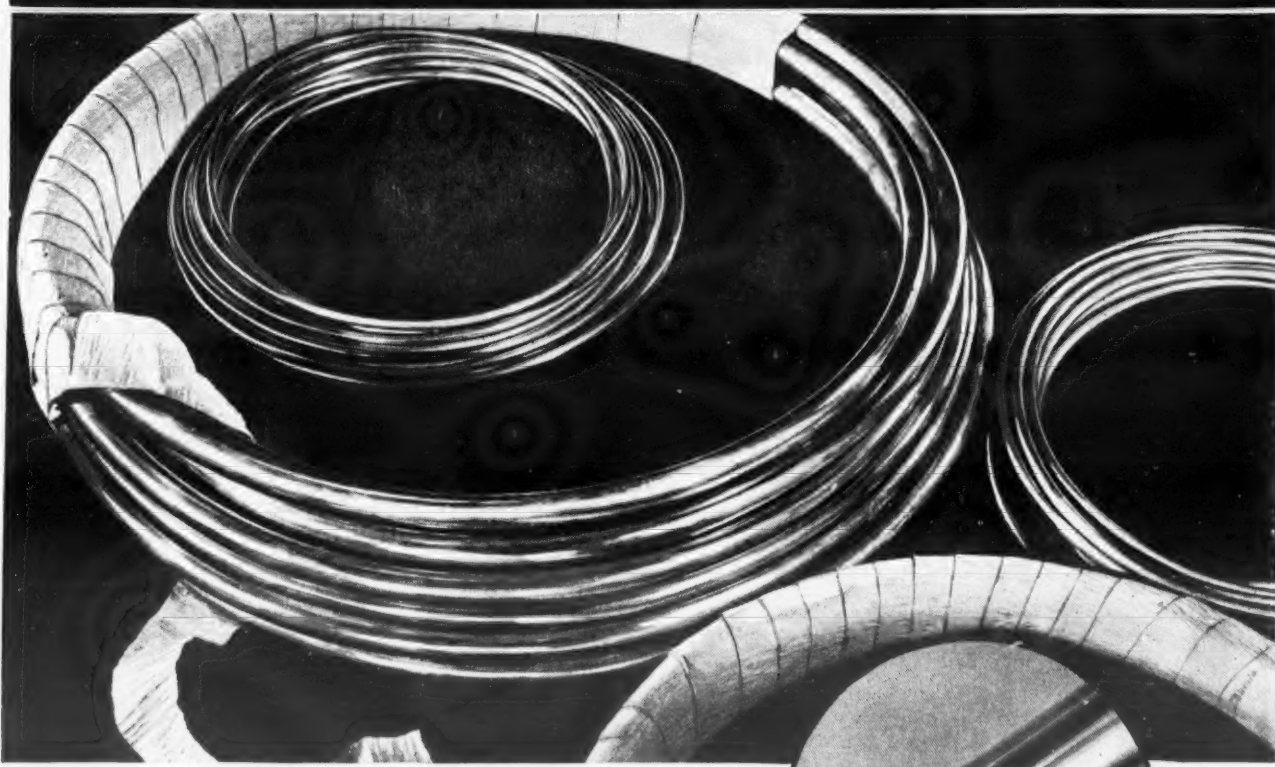
ST. LOUIS—Graybar Electric Co., Kelvinator distributor in this territory, held its initial showing of 1937 refrigerators, ranges, and home laundry equipment in an all-day meeting here Feb. 2 at Hotel Chase.

C. M. Armstrong, merchandising manager of the distributor, was in charge.

Apollo Displays Crosley Line in Newark

NEWARK—A three-day showing of the new Crosley refrigerators in this city opened Jan. 26 at the Apollo Distributing Co., 15-17 Shipman St.

ANACONDA COPPER REFRIGERATOR TUBES



Coils are wrapped in moisture-resistant paper which protects the finish of the tubes.

Cutaway view of inside of tube. Note the bright inside surface.

Specially deoxidized . . . thoroughly dehydrated, unusually soft

There are three outstanding reasons why Anaconda Copper Refrigerator Tubes enable you to do a first-class installation job quickly, easily . . . and with the best results for your customers.

1—Deoxidized. Anaconda Copper Refrigerator Tubes are 99.9% pure copper, specially deoxidized to increase their corrosion-resistance.

2—Dehydrated. These high quality tubes are thoroughly dehydrated. They are manufactured according to A. S. T. M. specifications by methods which assure unusually bright, clean inside surfaces.

3—Soft. Then, too, Anaconda Copper Refrigerator Tubes are unusually soft. They may be easily bent and will flare without cracking.

The leading refrigerator manufacturers' specifications for tubes to be used in installation work are met by Anaconda Copper Refrigerator Tubes. When you install them, you give the purchaser full value for his money. The result is increased good-will for yourself and for your business.

Anaconda Copper Refrigerator Tubes are carried in stock by leading distributors of refrigerator parts.



FRENCH SMALL TUBE Branch

THE AMERICAN BRASS COMPANY • General Offices: WATERBURY, CONNECTICUT



FOR 1937... IT'S
Kitchen-
proved!

- A sensational new Westinghouse Refrigerator! A sensational new sales-clinching program to go with it! World-wide kitchen proof! 623 certified tests in 89 home-proving kitchens confirm sensational records of
- BETTER FOOD PROTECTION
 - GREATER CONVENIENCE
 - FULL POWER
 - FASTER FREEZING
 - GREATER ECONOMY

**U. S. Government Buys 16,697
Westinghouse Refrigerators on
Lowest Over-all 10-year Cost**

A record-breaking purchase by the U. S. Public Works Administration Housing Division is another sales-clinching FACT that will help all Westinghouse Refrigerator dealers to GO PLACES IN 1937. Write the factory, at Mansfield, Ohio, for complete program.



Westinghouse

AROUND THE WORLD WITH GEORGE F. TAUBENECK

Ski-ing, bob-sledding, tobogganing, and ice skating rival each other for top honors in Switzerland's sports picture—yodelling and mountain-climbing are just habits, writes Editor George Taubeneck, who this week winds up his observations on Swiss folk and their habits with a discussion of the industrial, cultural, and athletic life of the country.

Moving into the Netherlands, "where nobody knows where he stands, because there are no figures available on sales," the editor records interviews with several leading distributors on the market for refrigeration and other household appliances in that country. These reports, with additional information on the effect of the country's recent "New Deal," will be continued next week.

By far the greater part of Switzerland's lakes and mountain streams find their way to the Rhine, and thence through Germany and the Netherlands to the North Sea. Of its lakes the principal are Lake Constance, Lake Lucerne, Lake Zurich, Lake Zug.

Agriculture

In Switzerland's area of 15,981 square miles, 11,443 are classed as productive land and the other 4,538 non-productive. The amount of productive land under crops, however, approximates only 2,500 square miles. Large areas are given to vineyards and pastures.

Wheat, rye, oats, and potatoes are the principal crops grown, while barley, corn, tobacco, sugar beets, and various vegetables are produced in lesser quantities.

About 20% of the productive land, or almost 2,300 square miles, consists of pasture land. The chief agricultural industry in Switzerland is that of dairy farming. The Swiss are internationally renowned for the quality and quantity of cheese and condensed milk they produce. In fact, Swiss cheese vies with Swiss chocolate, Swiss scenery, Swiss watches, and Swiss yodelling as an international tag.

Another profitable enterprise classed under agriculture in the Swiss government's reports (our source for this information) is bee-keeping. Excellent (if we are to believe the reports) honey is collected and marketed through the year.

Forests take up a large amount of the productive land area, 3,762 square miles being treed, mostly with maple, beech, and pine. Two-thirds of the forests are under cantonal and municipal control, and each year about 16,000,000 young trees are planted in accordance with the Swiss conservation scheme.

Switzerland's mineral wealth is very far from being fully exploited, partly because of the difficulties in mining brought about by the terrific unevenness of the land, and partly because of the inborn attitude of the Swiss peasant to be content with pastoral occupations.

However, a few minerals are worked in Switzerland, among them salt, marl, clay, limestone, asphalt, iron, copper, and lead.

Industry

Manufacture of textiles is the largest and most important of Switzerland's mechanical industries. Silk and cotton goods comprise nearly half of the total franc value of the nation's exports, and they are closely runner-

upped by linens, woolens, lace, embroideries, and ready-made clothing.

Other prominent manufacturing industries include watch, clock, and jewelry-making, shoe-making, tobacco products, pottery, glove-making, brewing, production of chemicals and provisions, machinery, and wood and metal-working.

Insofar as profit is concerned, the greatest Swiss industry is the entertainment and accommodation of tourists. There are more than 1,900 hotels in the country, representing a capital investment of about \$160,000,000, and in the maintenance of these establishments over 80,000 people are employed.

It is estimated that the number of people who vacation in Switzerland every year is in excess of 1,500,000. The great majority of this army of tourists is well-situated financially, and purse-strings once loosened are rarely drawn tight again in this land of pleasant relaxation and minimum annoyance.

Population

According to the census taken in 1930, the population of Switzerland was (in that year) 4,082,511. The Swiss people include at least four nationalities—Romanized Teutons and Celts in the west, Alman Teutons in the central and northern sections of the country, Romanized Celts in the east, and Italians in the south.

Of the present population, the government estimates that 68% speak German, 21% French, 8% Italian, and 1% Romanish. (Evidently, 2% don't speak.)

As regards political divisions, the city with the largest population is Zurich, in which community live 249,000 people. Of the cantons, Bern has the greatest number of inhabitants with 689,000 of whom 112,000 are in the city of Bern, capital of Switzerland.

Besides the large cities of Zurich and Bern, there is Geneva (seat of the forlorn League of Nations) with a population of 125,000, Lausanne with 76,000, Basel with 147,000, St. Gallen with 64,000, and Luzern with 47,000.

Craftsmanship

In woodwork, metalwork, glass and fresco painting, watchmaking and intricate embroidery work, the Swiss people have established so high a reputation for skill and painstaking detail as to mitigate somewhat their sterility in literature and art.

The golden age of the skilled Swiss craftsman occurred in the latter part of the 14th and early part of the 15th

Scenic Switzerland—Through a Train Window



This striking photo-portrait of a quiet Swiss lake, rimmed by the inevitable Alpine background, was snapped by the editor from a moving train.

centuries, when the churches, at that time rich and powerful, were chief patrons of the guilds. Evidence of this is to be found in the principal cathedrals in Switzerland today in the form of exquisite wood-carving and window-paintings.

This craft of wood-carving is kept alive in schools today in Brienz and Meiringen.

Now almost a forgotten art, glass painting flourished during the 15th, 16th, and 17th centuries. Best examples of this craft are now safeguarded in museums, although there are some good paintings in churches and old town halls.

In those years and even earlier, Swiss gold and silver smiths were famous throughout Europe. Their guilds were prominent in larger towns, and specimens of their work were eagerly purchased by churches both in Switzerland and in various other Continental countries.

Many examples of fresco painting are still to be found in northeastern Switzerland, particularly in the convent churches of the chain of Benedictine Abbeys along the Rhine from Basel to Bregenz.

Watch-making has reached its highest degree of perfection in the craft-shops of the French cantons, especially in the towns of La Chaux de Fonds and Le Locle. The embroidery center is St. Gall.

Swiss craftsmanship is best displayed in the National Museum in Zurich, the Historical Museums in Basel, Bern, and Luzern, and the Ariana Museum near Geneva.

Vacationing

That the popularity of Switzerland as a vacation resort has been so continuously widespread is due in no small measure to the policy of railway companies in making traveling simple and comfortable, and to the touring agencies in the country who pioneered the idea of arranging complete, economical tours in all parts of the nation.

In addition to just looking at the scenery, many visitors to Switzerland want to climb it. That is encouraged, too.

The Swiss Alpine Club, a private organization, founded in 1857, tenders

memberships only to those deemed to have high qualifications in mountaineering. It has a large, international roster, and its badge is worn by members with pride. The warm huts maintained by the club on all of the more frequently traveled ascents are a boon to all climbers, members and non-members.

Almost all climbers and would-be climbers hire guides to lead them up and down the mountains. The guides are, in general, trustworthy, courteous, and intelligent. Like guides everywhere, they take great pride in showing off their country. Most guides we've encountered seem to approach their daily tasks with awe and reverence.

In addition to guides, it is sometimes advisable and necessary for climbers to engage horses and pack mules for added safety and comfort. The animals are sure-footed, and know their own way.

The easy way of seeing Switzerland is to book a seat on one of the "diligence" tours arranged by travel bureaus. The majority of the "diligences" are now motor-vehicles (char-a-bancs to the English and sight-seeing buses to Americans).

Driving an automobile in Switzerland's hilly country is both risky and expensive. Steep grades, sharp bends, and none-too-good roads create the hazards, and stiff license charges, fees, and service charges boost costs. Gasoline prices seem prohibitive to the American, who is spoiled by the world's cheapest motor fuel.

The railroads, to come right down to it, are, in the main, the most comfortable and safest lines of travel available, even though changes of trains are frequent.

On the larger lakes there are innumerable and divers boats carrying passengers from port to port. They are almost as popular as are the trains, and the two usually run according to joint schedules, thus complementing each other. Boat fares vary according to the size and speed of the craft, but are generally cheap.

At most of the lowland resorts, the summer season begins in June and ends in the waning days of October, at which time crisp autumn comes in for a spell. In December, the winter sports season opens, lasting until

March in the higher holiday retreats. Spring rules from early March to June in places below the 1,500-foot mark.

Sports

Originally introduced from Norway (and now adopted whole-hog by America), ski-ing has become the Swiss national pastime. Bob-sledding, tobogganing, and skating are close runners-up for the honor. Yodelling and mountain-climbing are classed not as pastimes, but as habits.

Geneva, St. Moritz, Zurich and St. Gall have covered tennis courts which are in use the year round. The Swiss Lawn-Tennis Association arranges international tournaments under the direction of the competent judges and umpires. This association has taken part in the Davis Cup competition for many years, although its entrants never get anywhere.

Switzerland's rolling countryside is ideally suited for spectacular golf. All-year-round courses are maintained at Basle, Locarno, Lugano, Geneva and Aigle. Foreign visitors are allowed to take part in the various tournaments, and interclub matches arranged by the Swiss Golf Association.

In the rivers and lakes, noted first of all for their picturesque scenery, flourish fish of every description. Pike, trout, perch, grayling, chub, bream, and barbel are found in the waters of the lower country. Going higher you find the grayling most in evidence. In the highest reaches trout is the only inhabitant.

On the lakes most of the fishing is done from moving boats, while in the large rivers the casting rod and reel comes into practice. They say 30-pounders have been caught in the Swiss lakes.

With the exception of a strip from the mouth of the Birs to the Railway Bridge, angling in the Rhine is free; in all other waters fishing rights are leased, and permits are issued by the lease-holder.

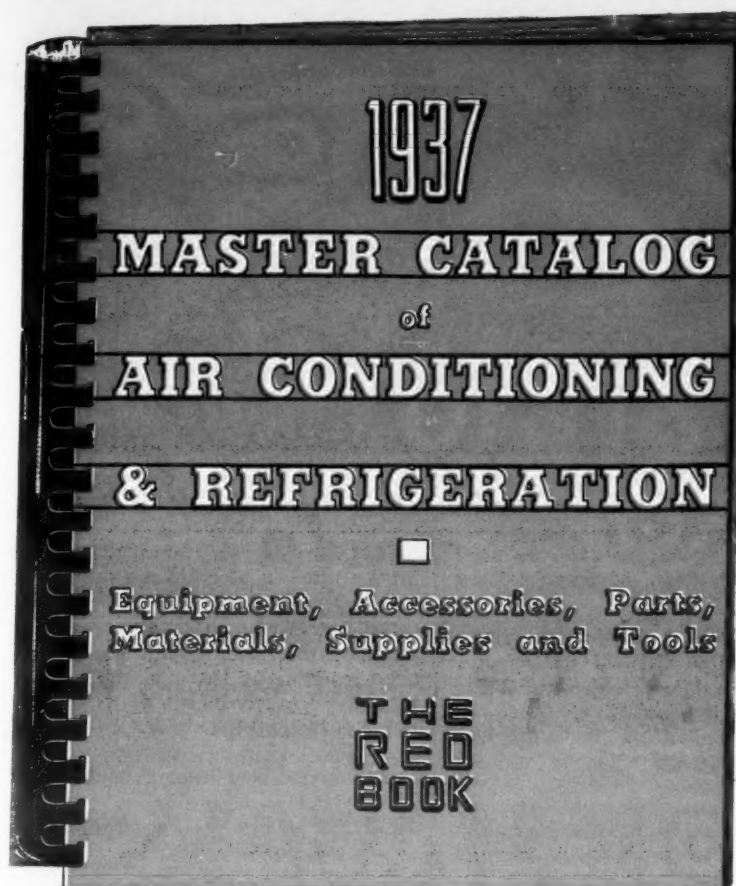
Angling with rod and line and single hook from the shore of the Lake of Zurich are free (live bait is forbidden), but trolling requires a Cantonal license. On other lakes around Zurich, except for bank angling, fishing is leased and preserved.

(Concluded on Page 10, Column 1)

Swiss Gardens, Towns, and Countryside Against the Ever-Present Alpine Background



Railroads, writes George Taubeneck, are, in the main, the safest and most comfortable lines of travel in Switzerland. These three views, showing gardens, towns, and countryside against the backdrop of the Alps, typify the beauty which abounds in this land of "pleasant relaxation and minimum annoyance." Like the photo above, the editor snapped them without leaving his train seat.



Deluxe Edition - - March 1937

The Red Book is being published in response to popular demand. On the one hand is a large group of manufacturers seeking to establish contacts with distributors, dealers, jobbers, installation and service companies. On the other hand is a great group of distributors, dealers, jobbers, service and installation companies seeking information in regard to air-conditioning and refrigeration products.

The Red Book will serve as an effective connecting link between those seeking new and additional outlets and those seeking new and better sources of supply.

The Deluxe Edition of the Red Book consisting of the first run of 5,000 copies will be distributed early in March and will be sent free but only upon request.

A very large number of requests have already been received. The Deluxe Edition will be sent to the "cream of the crop"—a hand picked list—from the standpoint of purchasing power. It will reach those buyers throughout the industry who are now in the market.

Send in your request for your copy of the Red Book today. Advertising rates and full information on request. Forms close March 1.

A Complete Service to the Refrigeration and Air Conditioning Industry

In addition to the weekly issues of the NEWS which accurately report important events and carry many valuable educational features of interest to all branches of the industry, Business News Publishing Co. also publishes a number of books to meet the need for specialized information and reference data.

The newest addition to this complete service to the industry will be the Red Book—the 1937 Master Catalog of Air Conditioning and Refrigeration Equipment, Accessories, Parts, Materials, Supplies, and Tools. Free distribution of the Red Book to 50,000 active buyers will give complete market coverage.

Also scheduled for publication in 1937 are four new volumes for your Refrigeration Library as described below. The insistent demand for information in regard to products and installation and servicing methods as reflected in the correspondence received at the offices of the NEWS has provided the market for these coming volumes. Each book will serve a definite purpose and will form a valuable addition to the permanent library of all those engaged in the industry.

It is suggested that you send in your reservation now for your free copy of the 1937 Master Catalog of Air Conditioning and Refrigeration (the Red Book) and also send in your order for the new volumes of the Refrigeration Library to complete your present set.

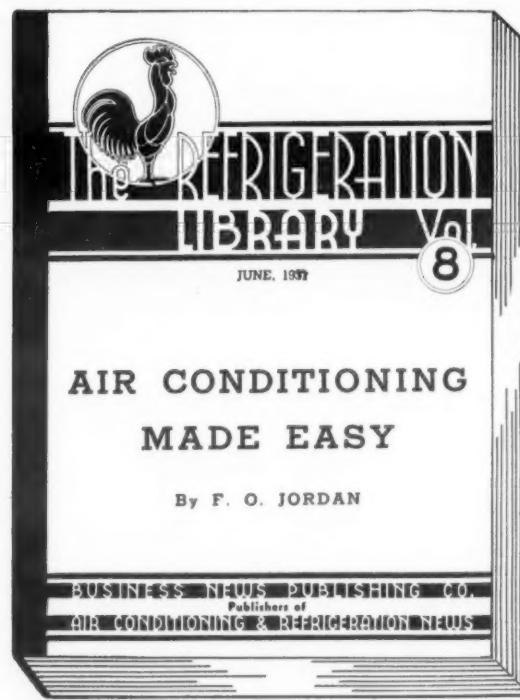
Coming! 4 Great Books for YOUR Refrigeration Library



Now appearing serially as a popular feature in weekly issues of the NEWS, Mr. Newcum discusses in his clear and practical manner the operation and servicing of the fundamental types of commercial systems. This is the first book to be published in the Refrigeration Library dealing with the servicing of COMMERCIAL equipment. It will answer an urgent demand for information of this kind among service organizations and will be very popular. To be published April 1.



The last edition of the Directory was published in 1935. Many vital changes in the industry have occurred during the past two years. The 1937 Directory will be a COMPLETELY NEW BOOK, listing names and addresses of all refrigeration and air-conditioning manufacturers alphabetically, by trade names, geographically, and by classification of products. A special section will be devoted to jobbers, finance companies, schools, etc. To be published May 1.



This important book is now appearing in serial form in the NEWS. Mr. Jordan, formerly with Airtemp, Inc., and Kelvinator Corp., explains the theory, design, installation, and operation of air-conditioning systems, including information for figuring installations and other useful data. Widespread interest in the air-conditioning field among all factors of the industry forecasts a big demand for this valuable instruction book. To be published June 1.



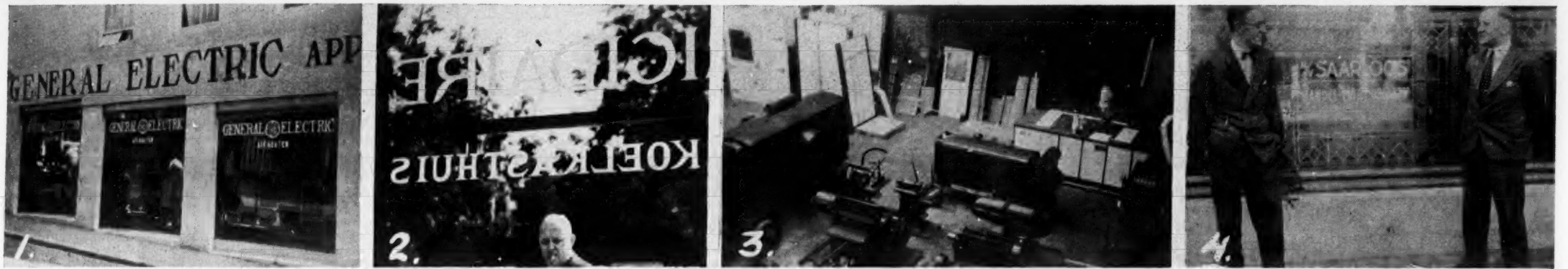
So popular was the Master Service Manual, written by Mr. Newcum in 1936, that the second edition of the book is now practically sold out. The new Household Service Manual will contain new information regarding servicing methods for all fundamental types of household systems. Like its forerunner, this book will serve both as a text book for refrigeration students and a handy reference for the experienced service man. To be published July 1.

Published in 1936 and still available: Vol. 4—Specifications, all models, all makes, all years. Vol. 5—Refrigeration Engineer's Manual. Prices: Single copies, \$3.00; any two books, \$5.00; any three, \$6.50; any four, \$7.50; any five, \$8.50; all six, \$9.50. Foreign postage 50 cents additional.

Business News Publishing Co., 5229 Cass Ave., Detroit, Mich.

Publishers of Air Conditioning and Refrigeration News

The Editor Looks in on Household and Commercial Showrooms in Rotterdam and Amsterdam



(1) Outside of the General Electric showroom in Rotterdam. (2) A prospect peeps through the Frigidaire display window in Amsterdam. This picture was taken from inside the showroom. (3) Commercial refrigerator shop of Van Rietschoten & Houwens, Rotterdam. (4) M. Saarloos and his partner, Crosley distributors in Rotterdam.

AROUND THE WORLD WITH GEORGE F. TAUBENECK

(Concluded from Page 8, Column 5)

Since Switzerland is a land of lakes and rivers, it is but natural that aquatic sports has reached the top here. Swimming is popular; rowing is more so. Switzerland has for many years played a leading role in European rowing.

Local regattas and international meetings are held there each year. Training begins in February, and by June everything goes in full swing. Most of the international regattas are held in the Lakes of Geneva and Constance.

Not infrequently one sees an entire family, or picnic party, taking a Sunday outing in an eight or 16-oared rowboat.

Sailing and motor boating are popular on the larger lakes. In Switzerland, as in other continental countries, walking has been elevated to the status of a game. If you're not planning a regular expedition, including a dozen or so top-notch peaks, with a couple of passes thrown in, it isn't expensive. Necessary equipment for a short trek—say a one day's trip—consist largely of a stick (a bit longer than the ordinary walking-cane), something to eat, and good strong boots.

Postal-cars and postal-coaches are plentiful along the main routes, thus giving a nice, safe feeling to the pedestrian. If he gets tired he doesn't have to walk home. It's a good idea to wear smoked goggles and some sort of face cream to prevent snow blindness and sunburn.

For a real expedition, of course, a guide is necessary, together with all sorts of paraphernalia.—Most of the latter can be sent ahead; but it's wise to take first-aid supplies, an ice axe, and rucksack, with you.

Basle

At the bend of the Rhine, in the center of Europe, is Basle, a cosmopolitan city which has achieved a world-wide culture, and salted down the experience of centuries. The writer had several hours between trains to roam Basle, and found it fascinating.

Everything in this beautiful little city bears the stamp of comprehensiveness. The University is said to have celebrities from all over Europe among both faculty and students. The Natural History Museum, Ethnological Museum, Public Art Gallery, (noted for its pictures by Holbein) are all worthy of this European seat of learning.

Music is the favorite art of Basle; commerce is her natural element. Commerce has made Basle a center of

banking, and the site of the Swiss Fair. Her geographical position fits her for the meeting place of international congresses and associations. Money comes to Basle for safe-keeping, from jittery capitalists in less Gibraltarish cities of Europe.

Culture is often the handmaiden of Capital; it is so in Basle.

History

Switzerland as it is known today, dates only from the Congress of Vienna (1815), after Napoleon had been exiled to Elba.

Foundations of the Swiss Confederation, however, were laid in 1291, when the three small German speaking districts of Uri, Schwyz, and Unterwalden united to form an "Everlasting League" against the increasing power of the House of Hapsburg.

This ultimately led to the Swiss War of Independence, which lasted from 1386 to 1389. In the Battle of Sempach, July 9, 1386, the Swiss defeated the Austrians, who were commanded by Leopold.

It was in this battle that Arnold von Winkelried, the legendary Swiss hero, was supposed to have led his countrymen against the enemy, gathered against his chest all the Austrian spears and swords he could lay hands on, and thus cleared the way for a wedge of victory. He thus became the first man in history to run interference.

During the fourteenth century the districts of Luzern, Zurich, Zug, Glarus, and Bern had been added to the union, and the eight members together won independence from the Hapsburgs.

In the early part of the 15th century, the confederation reached out for more territory, and an alliance with France led to its recognition as an important power in European affairs, after Switzerland had aided France in the defeat of Burgundy.

The territories of Fribourg, Soleure, Basel, Schaffhausen, and Appenzell were added to the federation in the late 15th and early 16th centuries.

Thus, with 13 German-speaking member provinces and a number of French, Italian, and Romanish-speaking subject or allied districts, did the Swiss Confederation remain in status quo until the invasion of Napoleon in 1798.

It was in the latter part of the 16th century that great numbers of Swiss men became professional soldiers to earn a livelihood. Many foreign rulers, particularly those of France, organized private troops of

"Swiss Guards." Even today the Pope has a small body of Swiss soldiers stationed in the Vatican City.

When, in 1798, Switzerland was incorporated with the French Republic as the Helvetic Republic under Napoleon's dominance, the Swiss lost their independence. The Treaty of Amiens drawn up in 1802 stipulated the return of Swiss autonomy, but Napoleon, by adding Vaud, Aargau, Ticino, Grisons, Thurgau, and St. Gall, organized the confederation as a union of 19 cantons to suit his own whims.

After the downfall of the First French Republic in 1814, the Allied Powers guaranteed Swiss independence and neutrality by another Treaty of Amiens. The number of cantons was increased to 22 by the addition of Valais, Geneva, and Neuchatel.

In this form Switzerland has since remained.

NETHERLANDS

No Figures

From K. ALTES, managing director of the General Electric distributorship, Mijnesses & Co., Keizersgracht 205, Amsterdam, I learned most of my

there are no figures available on sales in the Netherlands. Apparently it's a law, or something.

Other Appliances

General Electric refrigerators bring the biggest business to his firm of anything they handle. The oil furnace is just catching on, and some business has been done with the sewing machine. No room coolers or ranges have yet been sold by his organization. A G-E dishwasher was on display in the showroom, but none have been sold yet.

Swiss and German electric ranges are sold at prices ranging as low as 150 guilders; the G-E base price is 750 guilders, so you can see.

G-E commercial refrigeration equipment is sold on two-years' terms, 20% down. For awhile there was a general agreement among all refrigeration distributors in the Netherlands not to exceed these terms, but this agreement had broken down by the spring of '36.

Money was bringing only one-half of one per cent per annum at the bank at that time; and investors were looking for new risks, such as the time payment financing field, in hopes of getting a larger return.

Mobiloil in its Rival's Homeland



Socony-Vacuum gasoline and Mobiloil are sold 'round the world, even in the Netherlands, home of Royal Dutch Shell, Socony's biggest competitor.

lessons on economic and political the Netherlands.

Mr. Altes, ably seconded by three henchmen, Messrs. MULDER, METSGER, and HAMER, spent the greater part of a day analyzing the current situation in his country for me. A fundamentalist in his economic thinking, some of his pungent statements would have assuaged the hearts of our own Liberty Leaguers and "economic royalists."

The Netherlands, you see, have had their New Deal, too. But more of that later.

Mr. Altes is quite conscious of competition from German electrical appliances, namely the Protos (an off-peak refrigerator), Bosch, Ate, and DKV. He has also noticed the rise of Electrolux. Competition from American makes hasn't bothered him much so far.

But he agreed with everyone else I interviewed over there that nobody really knows how he stands, because

Washing machine business in the Netherlands is at present being battled for by two types: the wooden, and the enameled (but not rust-proofed). Wooden washers, manufactured in the Netherlands and Belgium, are being sold for 35 guilders, with motors lacking starting torque. To start, the owner must give the belt a tug, or the motor will burn out.

General Electric washing machines were quoted at 135 guilders and up.

Utility 'Promotion'

Most of the power companies are municipally owned, are "always broke," and spend practically nothing for promotion, new equipment, or extension of lines. Sole exception: water heaters, called "reservoirs" over there.

Because of utility promotion and selling, water heaters have gone over big in the Netherlands. A 40-litre model retails for 95 guilders; an 80-litre model for 125 guilders. Installa-

tion is free. A great many are rented by the utilities at rates ranging from 90 cents per month.

Holland is also said to be "vacuum cleaner mad." Per capita use is unusually high, and there is a large local manufacturing industry, of which the Efa is the most popular. Electrolux leads those of foreign make.

Canvassing, declare Dutch distributors, is out of the question in their country. Practically all prospects have household servants, and the salesmen never get past them. Electrical appliances are sold chiefly through "household stores," which sell kitchen utensils, dishes, and the like.

Ice is available almost everywhere in the Netherlands. In Amsterdam 25 kilos (55 pounds) retail for about a quarter. This price is cut in half in some of the smaller cities where butchers own shares in the ice plants.

In Amsterdam the power rates are a bit complicated. A flat rate, different for every house (dependent upon the number of outlets) is charged, with supercharges for water heaters and other appliances.

Westinghouse

Groenvelde & Co., large distributor of electrical and industrial machinery, represents Westinghouse Electric International Co. in Holland, specializing on the promotion of the Golden Jubilee line of household refrigerators. Directors of the firm are F. C. W. KOKER and P. J. GROENEVELD. Headquarters have been established in Amsterdam.

The firm has a working capital of \$100,000, and operates its appliance business chiefly through salesmen, who act as its subdealers in principal Holland cities such as Den Haag, Rotterdam, Arnhem, Haarlem, Groningen, Utrecht, Roermond, and Zwolle.

In addition to handling Westinghouse products, Groenvelde is also Holland agent for Oil-O-Matic oil burners, Mueller Brass Co. "Streamline" fittings, and Detroit Lubricator Co. products. The company maintains a department for the installation and servicing of heating, refrigeration, and pumping plants.

Export Managers Note

Klissers & Citroen specialize in the sale of sewing machines, washing machines, and cleaners, but wish also to include a line of electric refrigerators, and any other appliances which they might handle advantageously, according to a communication received from this firm.

Turnover of household refrigerators in the Dutch market is not very rapid, officials of this company say, for while the Netherlands is a hot country, refrigerators are considered a luxury.

Very few large units are sold here, the communication revealed, but there is some demand for a 3-cu. ft. refrigerator.

Antiquity in Modern Holland—Old-Fashioned Phonographs for Sale in a Delft Street Bazaar



(1) Old-fashioned "His Master's Voice" phonographs are for sale in the street bazaar at Delft, the Netherlands. (2) A prospective customer puts on a record to hear the tone for himself. (3) In the right foreground, a typical physiognomy of a Dutch girl, plus the ever-present bicycle. (4) Ice cream for sale. Java provided the inspiration for the ornate wagons from which frozen sweets are sold.

Servel to Use 100 Trailers in Promoting Electrolux

EVANSVILLE, Ind.—One hundred Dodge coupes and Aerocar trailers are being put into operation by Servel, Inc. The specially designed trailers will serve as showrooms-on-wheels for the promotion of Electrolux kerosene refrigerators.

The trailers have seating facilities for prospective dealers or customers. Both coupes and trailers have radio and public-address systems through which entertainment and sales talk may be broadcast.

The outfits will be used particularly

in rural sections, where Servel salesmen will contact wholesale and retail dealers and retail purchasers living on farms where neither electric current nor gas is available.

Blake to Manage Seattle Westinghouse Office

SEATTLE, Wash.—B. B. Blake has been appointed manager of the local office of Westinghouse Electric & Mfg. Co., succeeding W. D. McDonald, who will become assistant to vice president W. R. Marshall. Mr. Blake, a mechanical engineer, has been with the company since 1920.

Cook Directs Home Appliance Sales of F-M in San Francisco

SAN FRANCISCO—A special home appliance department has been placed in operation by the local Fairbanks-Morse office, according to Roger M. Murray, local manager.

R. A. Cook, who has been with the firm since the inception of its domestic appliance business, will be in charge of the new division. H. K. Rea, who formerly handled these appliances in addition to the company's regular dealer line products, such as electric pressure systems and pumps, will now confine his activities to the latter line.

Willkie Blames TVA for Lag in Appliance Sales Of Southern Companies

NEW YORK CITY—Failure of Southern companies in the Commonwealth & Southern Corp. system to show increases in 1936 appliance sales comparable to Northern companies reflects, in part, the deterrent effect which the Tennessee Valley Authority has had on private enterprise in that region, according to Wendell L. Willkie, Commonwealth & Southern's president.

"Under an aggressive uniform merchandising policy, the companies in the Commonwealth & Southern system sold to their customers more than \$18,000,000 worth of household appliances, surpassing all previous records of this company and all other utility companies," Mr. Willkie declared.

"Of this amount, \$8,600,000 worth were sold by the Southern companies, and \$9,800,000 worth by the Northern companies. In the South, the increase over 1935 in the sale of such appliances was 7.5%; in the North it was 40.5%, although equal efforts were made in each area.

"The difference reflects, in part, the retarding effect which the Tennessee Valley Authority has had on the development of private enterprise."

Contrasting the situation of subsidiaries operating in the TVA area with those operating in the North Central states, Mr. Willkie pointed out that the Northern companies, free from government competition, have been able in the past two years to refund more than \$250,000,000 worth of senior securities at low interest rates, and effect a saving in charges.

If Southern companies were able to refund their outstanding bonds and preferred stock on a similar basis, Mr. Willkie said, it would save them more than \$6,000,000 a year in interest and dividend charges. This would be equal to one-half the revenue received annually from their 400,000 domestic electric customers, he added.

Construction budgets of \$41,000,000, proposed by the companies for this year, are \$17,000,000 less than the budgets of \$58,000,000, originally proposed, Mr. Willkie stated. He attributed the shrinkage to TVA tax-subsidized activities.

"The absence of a solution to the problem created by the Tennessee Valley Authority," Mr. Willkie stated, "is a deterrent to further rate reductions, a bar to employment of additional men in construction work, and a prime cause of depreciation in the value of the property of security holders."

Eshman Joins Appliance Staff Of Fairbanks-Morse

INDIANAPOLIS—Appointment of R. I. Eshman as special representative for the Home Appliance Division of Fairbanks, Morse & Co. has been announced by W. Paul Jones, general manager.

Mr. Eshman's connections with the electric refrigeration industry date from 1925. Positions which he held at successive times include those of district manager, special representative and sales promotion representative with Kelvinator Corp.; supervisor of the midwest division, Westinghouse Electric & Mfg. Co.; manager of refrigeration sales with Midwest Utilities (Ohio Electric Power).

— PROFITABLE SALES METHODS —

'On Approval' Policy Helps Dealer Boost Sales 15% in 1936

MANHATTAN, Kan.—A liberal approval policy has pushed the 1936 refrigerator sales volume of Kipp Music Co. 15% over that of 1935. Actual number of units placed was only 10% higher than that of the previous year, but their higher unit price accounted for the additional 5%.

"Prospects," says owner Carl Kipp, "are obtained in the usual ways. Anyone who appears a good credit risk can get a unit on approval. All we investigate is their ability to pay and their credit history."

After installing the box in the prospect's home, the Kipp salesman begins an educational campaign which lasts throughout the entire week that the unit is on trial. He explains the unit's operation, so that the prospect may derive the greatest amount of benefit from it. He lets the user ask all the questions that were not asked or answered when the box was installed.

He explains to the user the technique of making frozen desserts. He suggests new recipes or new ways of serving food that are made possible by electric refrigeration. In short, he keeps the refrigerator sold, and educates the user for his unit.

During this period, the salesman never mentions closing the sale. He does not carry a contract with him. He does not "bother" the prospective customer.

Since every approval unit belongs to Kipp's until formally sold, great care must be taken in its installation and use. The home try-out should be no harder on a new refrigerator than a corresponding amount of demonstration in the store, Mr. Kipp believes.

If a prospect questions the unit's economy, and fears that its use will boost his electric bill unduly, Kipp's installs meters to check the amount of current used. Then it invites comparison with other makes also under the meter plan.

Often the salesman simply suggests that a prospect call one of his friends who has previously made this comparison. In a town the size of Manhattan, Kan., this personal reference seems to carry real weight. Often a doubting customer will make a favorable decision without making the suggested call.

About 80% of the boxes installed on Kipp's approval plan stay sold, records show. An additional 10% are sold ultimately, principally because the unit is withdrawn without any high pressure salesmanship. No further contact is made with these potential buyers until they are financially able to purchase the unit, or just get in the notion of buying. After withdrawal, the next move must come from the prospect.

The remaining 10% of the boxes are installed for prospects who are simply "poor guesses." These people, while probably desiring an electric refrigerator, are really in no position to purchase one.

Instalment Sales Increase 20% in Cheyenne in 1936

CHEYENNE, Wyo.—Local instalment sales in all lines for which figures were available increased almost 20% during 1936, according to the report of William F. DeVere, head of the Cheyenne credit bureau.

This increase, Mr. DeVere stated, was fairly evenly distributed between refrigerators, washing machines, furniture, radios, and automobiles.

Chattel mortgages and conditional sales contracts showed that the 1936 dollar volume of local refrigerator sales on the instalment plan totaled \$66,708.

Denver Dealers Are Giving Up Multiple Brands to Concentrate on Selling & Stocking Complete Line

DENVER—The trend of refrigerator dealers toward fewer but more complete lines is rapidly becoming apparent in the Denver area, according to C. R. Smith, Denver sales manager for Frigidaire Corp.

From his dealer contacts, Mr. Smith has found that those who handle multiple brands find their problems increased many times. Confusion results from involved book-keeping, intricate stock records, etc.

Probably the most baffling problem to multiple dealers, says Mr. Smith, is that of distributor policies. Advertising campaigns often have proved conflicting. Special campaigns promoted by the manufacturer of this or that refrigerator have often slowed down sales of the dealer's other lines, and caused dissension with other distributors, he finds.

Dealers also have found it difficult to teach their salesmen all they should know about so many brands, Mr. Smith says. This tends to lessen the effectiveness of their sales presentations.

Many dealers have admitted to Mr. Smith that they have lost sales as a result of not having certain models in stock when they are needed. They say that once a prospect has decided to purchase a refrigerator, delivery must be made immediately, otherwise the sale is lost.

Dealers agree almost unanimously, according to Mr. Smith, that their profits would increase if they carried more complete stocks and fewer makes of refrigerators. Some dealers, he says, have reduced their stock to one complete line, and are doing a better job of merchandising.



BRINGS BETTER PROFIT FROM REFRIGERATOR SALES

EMPLOYMENT IS UP . . . wages are increased, bonuses are paid. Millions who have been sitting tight for several years now have the confidence and determination to gratify their needs and their desires.

This will be a big refrigerator year . . . a bigger than average year for the dealer who finances his time payment sales through Commercial Credit Company. Buyers appreciate the fair terms and low cost of Commercial Credit Company financing

and have confidence in the reliability of this nationally known institution.

Commercial Credit Company financing will not only make more sales, but will protect you against loss from bad sales. Twenty-five years' experience assures a smooth-working credit investigation and collection system, leaves you free to concentrate on sales.

Offices in 168 leading cities in the United States and Canada provide prompt, close and reliable co-operation in every case.

COMMERCIAL CREDIT COMPANY

COMMERCIAL BANKERS
CONSOLIDATED CAPITAL



HEADQUARTERS: BALTIMORE
AND SURPLUS \$60,000,000

FINANCING SERVICE FOR MANUFACTURERS, DISTRIBUTORS AND DEALERS THROUGH 178 OFFICES IN THE UNITED STATES AND CANADA

University of Illinois Sponsors Demonstration Farms

URBANA, Ill. — Demonstration farms, designed to show the rural applications of electricity, are being sponsored by the extension service of the University of Illinois department of agriculture, in conjunction with farm bureaus and utility companies.

These farms are equipped with appliances, metered to show the cost of operation. Cost records will be kept for at least one year. At the end of this period, county meetings will be held at which the equipment will be inspected and the records checked.

The plan is expected to give practical guidance on the operating cost of such appliances as ranges, refrigerators, water heaters, water pumps, and electric brooders.

Parks & Hull Reorganized As President Leaves

BALTIMORE — Reorganization of Parks & Hull Appliance Corp., former local Westinghouse distributor, has taken place since S. Gordon T. Parks, former president of the firm, withdrew to become manager of the refrigeration division of the local branch of Westinghouse Electric Supply Corp.

George J. Roche, former treasurer of Parks and Hull, has become president of the firm, in addition to retaining his duties as treasurer. George E. Hull is vice president, and Arthur S. Foard is secretary.

Parks & Hull Appliance Corp. will continue to distribute Stromberg-Carlson radios, and in addition will be wholesale representatives for refrigeration replacement parts.

New Promotion Piece Lists Features of 1937 Pelcos

BLOOMINGTON, Ill. — Specifications of Pelco beverage cooler model 240, and Pelco combination cooler models 200, 112, and 74 are given in a recent promotion piece issued by Portable Elevator Mfg. Co.'s refrigerator division.

Eleven features of Pelco coolers are listed, and the Pelco "floating iceberg" principle of refrigeration is described. The bulletin points out the low first cost and low operating cost of the Pelco unit, emphasizing the fact that no installation charge is required. The unit is simply plugged into any light socket.

Beverage cooler model 240 has a capacity of 240 12-oz. bottles standing, 360 bottles corded. This cooler can be used under a counter as it has sliding lids running on a stainless steel track. The water tank is 14½ inches deep. The unit is equipped with the Pelco high efficiency twin-cylinder compressor with approved ½-hp. motor. Nine point temperature control is provided. Outside dimensions are: 84 inches long by 27 inches wide, by 34 inches high.

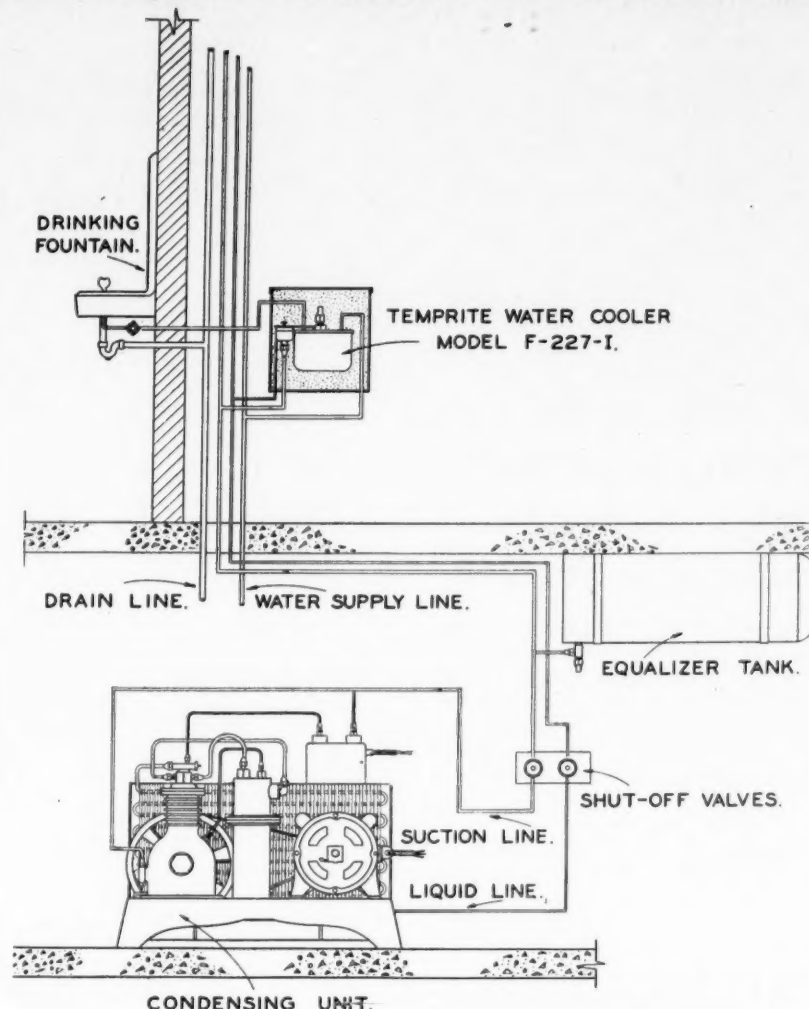
The model 200 combination cooler is equipped with the twin-cylinder Pelco unit and sliding lids. Capacity of upper compartment is 7.89 cu. ft., holding 138 12-oz. bottles standing, 192 corded. The lower compartment, with a capacity of 6.77 cu. ft., holds 135 bottles standing, 192 corded.

Model 112 has 2 inches of insulation on the sides, and 2½ inches in the bottom. The box is furnished with a single-cylinder unit, and has hinged lids. The cabinet is 43¼ inches high, 38½ inches long, and 23½ inches wide. The upper compartment has a capacity of 3.92 cu. ft., and will hold 86 12-oz. bottles standing, 120 corded. The 4.61 cu. ft. capacity of the lower compartment provides space for 96 bottles standing or 124 corded.

Insulation of model 74 is identical with that used on model 112. A single-cylinder unit is powered by a ¼-hp. motor. Lids are hinged. The cabinet measures 43½ inches high, 33 inches long, and 23½ inches wide. The upper compartment has a capacity of 2.95 cu. ft., and holds 62 12-oz. bottles standing, 95 corded. The lower compartment has a capacity of 3.54 cu. ft., and holds 71 bottles standing, 106 corded.

All coolers are finished in the standard Pelco red with stainless steel trim and chromium-plated solid brass hardware. The two smaller models are fitted with rubber casters.

How Temprites Are Installed in Merchandise Mart



Drawing showing connections from compressor to cooler, and from cooler to fountain, in installation for world's largest office building. Eleven Temprite bubblers furnish drinking water on eleven different floors, all refrigeration being supplied by one compressor.

COMMERCIAL REFRIGERATION

Eldridge Co. to Install \$74,000 G-E Order At Princeton

PRINCETON, N. J. — Refrigerating equipment valued at \$74,000 will be installed in the new Nassau Tavern, to be completed Sept. 1, 1937. The sale was made by Harold Eldridge, local General Electric Co. dealer. Judson C. Burns is distributor in the territory.

Refrigeration for the tavern will be required to take care of dairy products, vegetables, meat, beer storage, a bakery, cafeteria, main kitchen, ice storage, and ice making. Equipment called for includes 16 condensing units, 18 chilling units, 16 thermostatic expansion valves, and seven drip pans.

The tavern is being constructed as part of Princeton's \$4,500,000 reconstruction program. Launched early in 1929 by Edgar Palmer, president of Princeton Municipal Improvement, Inc., this program called for construction of the Nassau Tavern, a theater with a seating capacity of approximately 1,200, an apartment house, some two dozen stores, and an unnamed public building. All of these buildings were to harmonize with town and university buildings in adjacent areas.

Building activity was, however, seriously curtailed during the seven subsequent years of depression, and it was not until last September that construction of the tavern actually commenced.

The tavern will really consist of three separate sections: the original tavern, supposedly built during Revolutionary days; a small addition, presumably made a few years later; and a larger brick structure, supposedly added about 1850.

Four Refrigerated Trucks Start Fish-Haul Service

NEWARK — Four big dry-ice refrigerated reefers recently were put into service by Harrison Motor Freight Co., here, to haul fresh and frozen fish from Boston to Philadelphia. These trucks make this 325-mile trip in 14 hours.

Load capacity of each body is 25,000 lbs. Inside dimensions are: length, 43 feet; width, 8 feet; height, 6 feet 3 inches.

Four inches of Dry-Zero insulation are used in the roofs, 3 inches in the sides and ends, and 2 inches in the floor. The bodies will hold a temperature of 5° F. for frozen fish, or 40° F. for fresh fish.

A.C.F. tractors model TT-160 are used to haul the Fruehauf semi-trailer units.

Temprite System Supplies Water In Chicago Mart

CHICAGO — A Temprite multiple water cooling system has been installed in the Merchandise Mart, largest office building in the world, to furnish drinking water throughout the building.

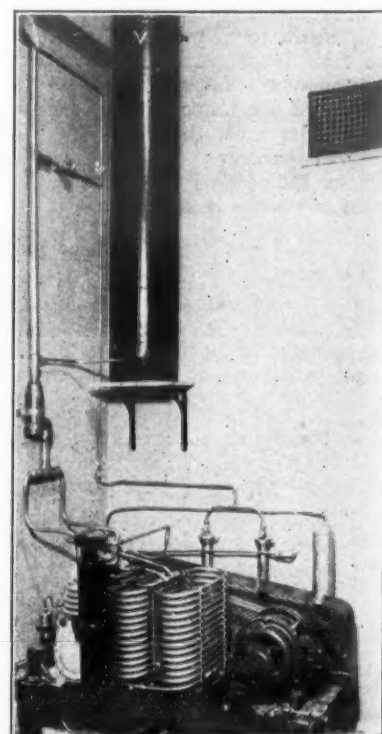
Eleven model 227-I Temprite coolers supply cooled drinking water to 11 existing bubbler fountains, on different floors, which formerly supplied ordinary city water.

Refrigeration for the Temprite multiple system is furnished by a 3-hp. General Electric condensing unit.

One feature of the installation is that three sizes of hard-drawn copper suction line are used. The coolers on five floors at the top of the risers take ¾-inch tubing, the coolers on the lower six floors take 1-inch tubing, and the horizontal suction line of 145 feet is 1½ inches in diameter.

Also used in the Merchandise Mart system is an equalizer tank, which is said to prevent short cycling of the compressor, and permits temporary overloading of the cooler.

For Water Cooling



General Electric 3-hp. condensing unit, and surge tank, used in Merchandise Mart system.



HILL REFRIGERATORS ARE EASIER TO SELL

THE new Hill line of improved Reach-in Refrigerators for restaurants, hotels, institutions, hospitals and bakeries is easier to sell because better made—and noticeably so. The low conductivity corkboard insulation is thicker, the interior and exterior are genuine porcelain, the hardware is of special design, the coils are more easily reached, the proportions are more graceful, and the refrigeration is better.

Send for 32-page illustrated catalog, describing outstanding HILL features and listing complete specifications.

Hill Products Division
C. V. HILL & CO., Inc., TRENTON, N. J.

WOLVERINE COPPER TUBING FITS ALL FITTINGS

Not only is Wolverine Copper Tubing uniform in quality, but it is made to such close tolerances that you will never have any trouble making a quick installation—it will make a quick connection with any standard sweat fitting that you happen to have in stock.

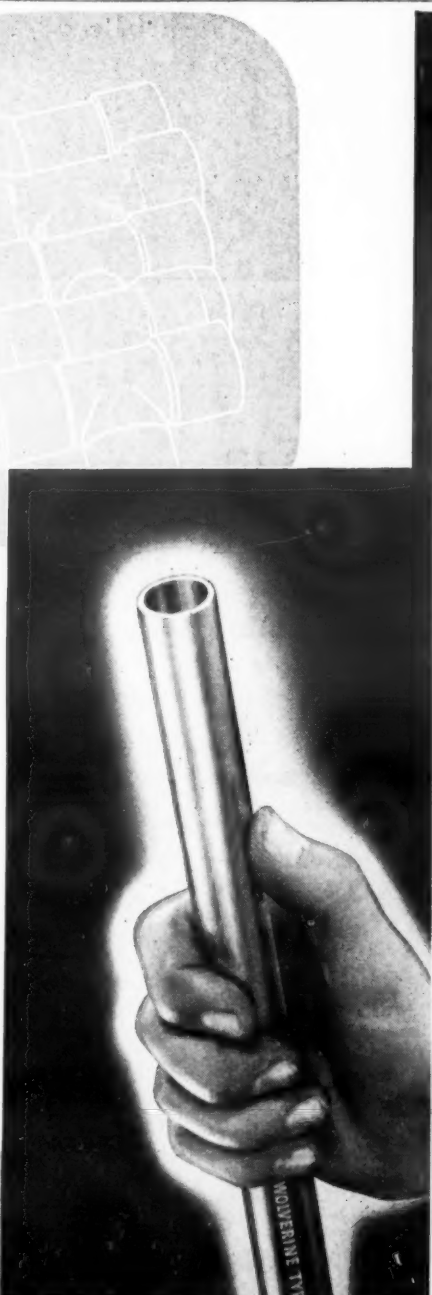
Wolverine Copper Tubing in types K, L, and M is made to Government and A.S.T.M. specifications. You can readily identify it by the name "Wolverine" and the type which is stamped at regular intervals along the tubing.

Wolverine Refrigeration Tubing is made of 99.9% pure electrolytic copper, annealed to the exact specified softness in a deoxidized and dehydrated atmosphere. A clean mirror-smooth inside surface is uniform in every coil.

Use copper tubing that comes from one of the most modern tube mills where the individual care that is given to each length has earned it the reputation of being a product of "True Craftsmanship".

WOLVERINE TUBE CO.

1411 CENTRAL AVENUE DETROIT, MICHIGAN
CABLE ADDRESS "ROBNS-DETROIT"



Utility Makes Milk House into Kitchen and Poultry Equipment Display

CONCORD, N. H.—Latest promotional venture of New Hampshire Public Service Co. is the transformation of its all-electric milk house on wheels (REFRIGERATION NEWS, Dec. 23, 1936) into a combination kitchen and poultry equipment display.

This new campaign is designed especially for poultry farmers. The dairy trailer was dismantled, the milk-room equipment removed, and the new combination display installed. An electrified kitchen is now at one end, the

poultry equipment at the other.

The head of University of New Hampshire's home economics department and the utility's home service director have cooperated in planning the kitchen portion of the display.

The new display will be shown at meetings conducted by the university's extension service, at grange meetings, and in isolated communities. An agricultural specialist and a home service representative will accompany the trailer on its tour.

COMMERCIAL REFRIGERATION

Russ Co. Institutes Factory Branch Distribution

CLEVELAND—A nationwide distribution readjustment program, designed to make the planning and merchandising services of Russ Soda Fountain Co. directly available to fountain and dairy store equipment buyers, was announced last week by H. W. Wilmarth, president of the company.

Under the new plan, the company will discard the indirect type of distributor setup in favor of new sales outlets, established through the country on a direct-factory basis. These outlets, closely directed by Russ divisional sales managers, will be better qualified to assist prospective buyers in the selection of proper equipment for each specific installation, company executives believe.

Closer supervision of all sales outlets will also be possible under the direct-factory plan, it is believed, and better service will be rendered through more intimate knowledge of existing territorial problems. Designing, engineering, and research services of the company will be available on a wider scale than is possible through indirect representation, and costs of distribution will be materially reduced, officials state.

Master Takes over Kari-Keen Refrigerated Locker Co.

SIoux CITY, Iowa—Master Refrigerated Lockers System, Inc., has taken over the locker manufacturing business of the Kari-Keen Co. here. W. W. Wilson is head of the new firm, while E. L. Mohr is vice president.

A plant has been opened at 119 Main St., equipped with new presses, lathes, folders, shapers, welders, and compressors. Tools and dies have been purchased from the Kari-Keen Co.

Although the new company has 4,000 orders on hand, Mr. Wilson said persons who formerly dealt with the Kari-Keen Co. would experience no delay in deliveries.

Jernberg & Iams Made District Sales Engineers for Mills

CHICAGO—F. L. Jernberg and Hillis Iams, former field engineers for Mills Novelty Co., have been appointed district sales engineers in the commercial refrigeration division of that organization, according to R. F. Polley, division sales manager.

Mr. Jernberg will represent the division in Wisconsin, Minnesota, Iowa, and bordering cities. Mr. Iams' territory will include most of Ohio western New York, Pennsylvania, and northern Kentucky.

Cleveland Market Operators Ask Refrigeration Extension

CLEVELAND—A \$100,000 addition to the refrigeration system of Cleveland's West Side Market is being sought by operators of the 93 stands comprising the market.

There is adequate refrigeration in the basement to store large quantities of produce, but the merchants are requesting that the city extend the system to the stalls. This would create more sanitary conditions, and enable the stall operators to compete with more modern establishments, it is claimed.

The proposal is now before the city council.

Cosby Made Honorary V. P. of Kelvinator Pioneer Club

BIRMINGHAM, Ala. — Ranking second among Kelvinator commercial refrigeration salesmen in the United States, C. B. Cosby, western division commercial sales representative for Alabama Power Co., has been elected honorary vice president of the Kelvinator 1937 Pioneer Club.

Frigidaire Men Visit Canadian Case Factory

OWEN SOUND, Ontario, Canada—Directors, executives, and sales forces of both Eureka Refrigerator Co. Ltd. and Keenan Woodenware Mfg. Co. Ltd. recently met here with representatives of Frigidaire Corp. for an inspection tour of both the Eureka and Keenan plants. The inspection was followed by a combined dinner meeting at the Sydenham Club.

Frigidaire representatives were W. Kennedy, commercial division manager, and W. Wilkinson, sales engineer. Eureka Refrigerator Co. Ltd. and Keenan Woodenware Mfg. Co. Ltd., both divisions of Keenan Industries, have been working with Frigidaire throughout the past year. More than 200 people are employed in their two plants. The Eureka division is now building several new models of refrigerated counters, all of which are equipped with Frigidaire compressors and coils.

Speaking at the dinner meeting, executives and directors of Keenan Industries emphasized the splendid work that had been done during the past year, expressed their appreciation of the cooperative spirit shown by employees, and ventured predictions of even greater progress for 1937.

W. D. Elliott, manager of the local branch of the Canadian Bank of Commerce, spoke on financial conditions during the depression, and attempted to explain the viewpoint of banking officials during that period.

W. Kennedy, Frigidaire commercial manager, discussed the history of Frigidaire, and its growth during depression years. He expressed the opinion that Eureka Refrigerator Co. would benefit greatly from its work with Frigidaire in the territory cover-

ing York and Peel counties. Stating that Kelvinator had pioneered refrigeration equipment in Canada, he concluded by expressing great hopes for the future of both refrigeration and air conditioning in this country.

F. A. Johnson, manager of the Eureka division, voiced the hope that his firm would continue its good work so that Frigidaire Corp., at the end of the year, would feel inclined to ask the Eureka organization to take on further territory.

Other speakers included: D. F. Kennedy, J. R. McLinden, and G. D. Fleming, directors of Keenan Industries; F. J. Sutton, general manager of Keenan Industries; James Rutledge, Western Ontario representative of Eureka Refrigerator Co.; John McGill, superintendent of Keenan Woodenware Mfg. Co.; J. A. Fitzgerald, Montreal; F. C. Baker, H. Davidson, and J. Shannon, Toronto.

G-E Announces Coin-Operated Time Switch for Appliances

SCHENECTADY—A new coin-operated time switch for dispensing the service of appliances has been announced by General Electric Co. The switch operates for 30 minutes when a 10-cent coin is deposited in it. It is powered by a standard Telechron motor, operating on 115 volts, and in either 25, 50, or 60-cycles frequency rating.

A feature of the switch is the off-on device, which permits the operator to obtain either continuous or intermittent use of the appliance for the full length of time purchased.

Another feature which the switch provides is a bank with a lock for the use of the collector. The authorized collector may remove the bank from the time switch by a key provided. The "bank" automatically closes and locks itself as it is removed.

As an optional feature, this switch can be equipped with a thermal cutout.

Trainload of New G-E Units Arrives on Coast

SAN FRANCISCO — What is thought to be the largest single shipment of electric refrigerators to be ordered by a single distributing outlet so far this year has arrived here from General Electric Co.'s New York State plants.

This shipment, consisting of an entire trainload of 1937 G-E refrigerators, was ordered by the local branch of General Electric Supply Corp. for its retail outlets in northern California.

After watching the trainload start on its transcontinental run, officials of G-E's specialty appliance division cooperated in publicizing the train's arrival in California. Banners bearing the names of dealers for whom the cars were destined were placed on each freight car. Special advertising was prepared for the train's arrival. Displays were set up on dealers' floors, and the shipment was publicized in movies and newspapers.

F. L. Shaw Joins Contact Staff Of Jam Handy Picture Co.

DETROIT—Fred L. Shaw, until recently publicity director of Brooke, Smith & French, Inc., advertising agency, has joined the contact staff of the Jam Handy Picture Service, Inc., President Jamison Handy of the company announces.

Experienced in the electric refrigeration field, Mr. Shaw was a member of the public relations staff of Frigidaire Corp. from 1928 to 1932. During the next three years, as a member of the Brooke, Smith & French organization, he directed public relations for Kelvinator and Leonard.

Sell the RIGHT BELT FOR EVERY APPLIANCE

PRACTICALLY every make and model of appliance requires its own special size fractional horsepower V belt for satisfactory operation—a belt that is absolutely accurate in both length and cross section.

You can satisfy every customer with Goodyear Endless Cord V Belts. They are "tailor-made" in a complete range of sizes to fit every type and size of air conditioning unit and refrigerator. Each one is the exact width to fit the sheaves snugly. Each one is the correct pulley-to-pulley length, built truly endless with Goodyear's famous endless cord construction—the most nearly stretchless known!

Because Goodyear V Belts fit perfectly, they run the machine perfectly—efficiently at correct

speed—quietly without slip or slap. Because they are virtually stretchless, they last far longer—make lasting friends for you. And because you have the right belt for every customer, you make more sales, bigger profits.

For information and prices call your jobber, or write Goodyear, Akron, Ohio, or Los Angeles, California.

GET THESE SALES HELPS

Handsome three color all-metal wall display rack (shown above) furnished with standard Goodyear assortment containing 27 year assortment containing 27 belts in most popular sizes. Also handy Application Guide telling type of Goodyear Belt required by every appliance.

THE GREATEST NAME IN RUBBER

GOODYEAR

FRACTIONAL HORSEPOWER ENDLESS CORD V BELTS



AIR CONDITIONING AND REFRIGERATION NEWS

Established 1926, Registered U. S. Patent Office as Electric Refrigeration News.

Published Every Wednesday by
BUSINESS NEWS PUBLISHING CO.
5229 Cass Ave., Detroit, Mich.
Telephone Columbia 4242.
Cable Address: Cockrell-Detroit

Subscription Rates
U. S. and Possessions, Canada, and all countries in the Pan-American Postal Union: \$3.00 per year; 2 years for \$5.00. All other countries: \$5.00 per year. These rates will be increased on March 1, 1937.
Notice: Please do not pay money to strangers claiming to represent this paper. We employ no subscription solicitors. Send orders and remittances by mail.

F. M. COCKRELL, Publisher

GEORGE F. TAUBENECK, Editor
PHIL B. REDEKER, Managing Editor
THEODORE T. QUINN, Assistant Editor
WINIFRED HUGHES, Assistant Editor
Departmental Editors
K. M. NEWCUM, Refrigeration Service
F. O. JORDON, Air Conditioning
Staff Writers
WILLIAM H. LONG, ALFRED JONES,
JAMES McCALLUM, and ROSS POTTER

R. T. CARRITHERS, Advertising Mgr.
HELEN K. GILMORE, Asst. Adv. Mgr.
JAMES B. SMITH, Asst. Adv. Mgr.

JOHN R. ADAMS, Business Manager
ROBERT P. NIXON, Asst. Business Mgr.
JEAN H. ADAMS, Subscription Manager
LOLA E. DEW, Circulation Manager
WINIFRED MERSON, Spec. Representative

Advertising Representatives
JOHN B. GALLAGHER Co., Inc.,
11 W. 42nd St., New York, N. Y.
Pennsylvania 6-1380
LEWIS & NOELLE
612 N. Michigan Ave., Chicago, Ill.
Superior 8568

Member, Audit Bureau of Circulations
Member, Associated Business Papers

VOL. 20, No. 5, SERIAL NO. 411
FEBRUARY 3, 1937

Copyright, 1937, Business News Pub. Co.

Turning the Tables

TIME was when the department stores were the black sheep of the refrigeration merchandising business. It was the department stores which first demanded a \$99.50 refrigerator and, failing to get it from established manufacturers, induced the so-called "fly-by-nights" to enter the business with their "jillopy" models.

Department stores, a few years ago, were accused of being chiselers. Discounts were never long enough; they wanted to buy direct; they could not be depended upon to maintain list prices; they bought job lots at a long discount, slashed the advertised prices, and worried "legitimate" dealers half to distraction by their price advertising. Specialty selling was something they not only couldn't understand, but refused to consider.

Today the situation seems to be reversed. The department stores are sticking to nationally advertised makes of electric refrigerators. They are, with rare exceptions, maintaining strict list prices. They have gone in for specialty selling in a big way, including the house-to-house "cold canvass" which they scorned for so long. And now they are the ones who are kicking about irresponsible dealerships which cut prices.

One of the chief problems up for discussion at the recent National Retail Dry Goods Association convention's appliance merchandising session was: "What can we do about small dealers who cut prices, while we maintain listed quotations?"

Answers to this question varied. Some department stores send out trained shoppers seeking discounts from other dealers. If they get them, the matter is at once reported to the distributor who franchised that dealer. Pressure is then brought to bear upon the distributor or branch to control his dealers, keeping them in line on prices.

Other department stores support local dealer associations, although

during the early days of such associations the members often complained that their work went for naught because the department stores would never cooperate. Through the associations fair trade practices, and list prices, are maintained.

Still another method followed by department stores is that of checking through the finance companies the selling price of every refrigerator sold in their territory. If they find that a price has been cut, they put through a claim for compensation to the distributor, just as the latter would ask for a commission from his manufacturer if another distributor had shipped a refrigerator into his territory.

To the refrigeration industry, the fact that the department stores are not only maintaining list prices themselves, but are policing other dealers themselves, is an indication of a remarkable right-about-face.

Another complaint of specialty dealers in times past was that they experienced difficulty in competing with the terms offered by department stores, with their well-established credit departments, and their oftentimes large cash backlog.

Nevertheless, the department stores are now working to shorten the period of time payments, and to raise the ante on the initial instalment. Reasoning that the market is moving down into lower income brackets, where the risk of repossession is reputedly greater these merchandisers are sponsoring a movement toward a two-year limit on payments.

Along this same line, the department store group is now questioning the wisdom of winter financing plans (selling a refrigerator in the fall, suspending payments until spring). It has been their observation that the customer is likely to return the refrigerator, having made no payments at all, when manufacturers introduce their new models in December and January.

Finally, a strong faction among the department stores is agitating against the five-year warranty. This may be all right for a dealer who makes only one sale to a customer, say they, but in their case, they are trying to make monthly or even weekly sales of all types of goods to that customer. And they can't afford to incur the ill will engendered by misleading warranties.

It has been their experience that the woman who buys a refrigerator with a five-year warranty doesn't expect to pay another penny on that refrigerator during that period (sometimes they don't want to pay for service after the guarantee has expired, either).

When the owner discovers that the warranty has its reservations, she sometimes vents her anger by withdrawing all her trade from that store. Or, liking the five-year guarantee idea, she expects to be given the same type of guarantee on other appliances and items she may buy from that store.

Department stores are now saying that unless manufacturers can give an unqualified guarantee for a specific period—instead of the "tricky, misleading, obscured-meaning" warranties now offered, they shouldn't attempt to give any guarantee at all.

Many of these big merchants are finding it good policy to extend free service during the guarantee period even if adjustments demanded aren't covered by the warranty, merely as a matter of protecting good will. They have

to dig down into their own pockets for that, and they don't like it.

For some years the department stores seemed to have an inferiority complex with regard to appliances. They didn't understand specialty selling, and all they knew how to do was use a nationally advertised refrigerator, say, for a price leader, to get new customers and increase floor traffic.

But recently they have come to realize some of the advantages they have in this type of selling: location, reputation, traffic, trained credit departments, and a complete line of home furnishings—so that the customer can get everything she needs for her home under one roof. In consequence, they have learned the whys and hows of specialty selling. Their volume on appliances has increased tremendously as a result; likewise their profits.

And today the department stores are standing forth as the solid substantial citizens among the industry's merchandising organizations. As such, they should be accorded the respect, and the consideration, they now appear to deserve.

- QUOTED -

The Sitters Down

IF the servant girl in the kitchen should refuse to allow the mistress of the house to use her own stove, or remove her own victuals out of her refrigerator, or eat her own food off her own dishes, there would be an intimate presentation of the principles involved in the sitdown strikes in industry.

There is no good coming from these sitdown strikes. None can come.

If the clerks in a store were to take possession of the premises, burn the owner's coal to keep warm, and consume the water for which he pays, we would have an application of the principle which John L. Lewis has invoked in the automobile strike.

If the gardener were to seize his employer's garden, refuse to allow the owner to till it, or to till it himself; if the farm hand would refuse to allow the farmer to cultivate his acres, milk his cows, or exercise his horses, we would have the same thing.

The great majority of workers thrown out of employment by Mr. Lewis' endeavors to add to the millions which flow into his union treasuries out of the pay envelopes of the workers, don't know what it is all about. They are satisfied with their pay. So is Mr. Lewis, if the truth were known. His talk of higher wages and shorter hours is only talk. He has too much sense to believe in the possibility of any such stuff. But, how else can Lewis get his fingers into the pay envelopes of the unorganized workers?

The workers have everything to lose by a successful issue of Mr. Lewis' tactics.

If there is no security for property, who is there wanting property?

Security makes property desirable and desirability makes value.

Property values are the basis of wages.

If the chauffeur may appropriate his employer's car and drive it around at the owner's expense, and may keep the owner wholly out of the use of his property, who wants to buy an automobile?

If there is no demand for automobiles, how will the automobile workers find employment?—Somerset (Pa.) American.

- LETTERS -

Some 'Do's' and 'Don'ts' On Handling Trade-ins

Honolulu Technical School
800 S. Beretania St.
Honolulu, Hawaii
Jan. 7, 1937

Editor:

In the issue of Dec. 9, Norman Freeman of Titche Goettinger Co., advises stores faced with the used refrigerator problem to give each trade-in electric or gas refrigerator a good coat of paint, fix up the mechanism and resell to the huge market looking for used machines less than \$100.

Although we are a school, we have taken all trade-in machines from the largest local dealers for over two years and we have found the following:

1. Don't sell a machine with the

mechanism merely adjusted or fixed up, in other words, a patched up job—the reason? The present buyers of \$50, \$60, and \$75 machines are potential buyers for brand new ones when they get more prosperous. Sell them a junk today and they'll never buy from you tomorrow.

2. We rebuild machines completely. It is slightly more expensive but builds goodwill to put in a new compressor, a new control, and a new evaporator and charge more. This is better than to sell something that will be noisy, expensive to run and be generally unsatisfactory.

3. It is better for dealers (from the experience of the leading dealers in Hawaii) to turn over all used boxes to a central organization. By this means the new dealer has no connection with the old equipment. Here in Hawaii the Honolulu Technical School takes all this old junk. 40 to 50% of it, after careful examination, is junked and any good parts removed for later use. The workable boxes are totally rebuilt and the fact that our service department has as low a percentage of trouble calls as new dealers means satisfied buyers; buyers who will later buy new machines because they will be sold on mechanical refrigeration.

Under the old plan the General Electric dealer, for example, would sell his old trade-in Gibson, Frigidaire or other brand by merely giving the box a spray of lacquer and charging with new gas. Resultantly, when the box went haywire after a few months of use the customer starting knocking the General Electric dealer. This meant loss of prestige to the dealer and the box he sold.

The public, for some reason or other, cannot be made to see that when they pay \$25 for a 5 ft. refrigerator with no guarantee of any type, they are not buying a new machine and not paying for it. Yet when the \$25 box gives trouble they want free service and feel that they have been gyped when they don't get it.

Hawaii has found by sad experience that for a new dealer to sell used unguaranteed equipment is bad business and we feel that for the benefit of the whole industry the mainland dealers should be governed by experience, costly to Hawaii, which is available to the mainland dealer at no charge.

S. E. GILES,
Manager.

Local Opportunity In Old Kentucky

Lambert-Grisham Hardware Co.
First and Elm Sts., Henderson, Ky.
Jan. 30, 1937.

Gentlemen:

We have a fine opening for some one and we are very, very anxious to find that some one. If you can help us or have any suggestions please let us have them. They will be appreciated!

We have eight or ten counties in western Kentucky in which we need representation for Kelvinator commercial refrigeration, Viking display cases, and other minor lines which fit in with these two.

The territory, while not particularly good from the standpoint of wealth or business, is nevertheless a good territory. This is due to the fact that we have very little competition and a salesman, representing Lambert-Grisham Hardware Co., would have a decided advantage over the small amount of competition which would face him.

We are looking for a man who has had commercial experience or who has had some retail specialty selling experience and who is bright enough to learn the fundamentals of commercial refrigeration.

If you know of any such person, please let us know at once. Otherwise, will you file this letter so that you can refer to it if you should come in contact with such a person in the next few months.

VAN ERTEN BENT.

Answer: If you don't get the desired response from the publication of this letter, you might well try our classified advertising columns.

A Late, But Interesting Letter on '37 Prospects In Air Conditioning

Skinner Heating and Ventilating Co., Inc.

Heater Division of
St. Louis Blow Pipe & Heater Co., Inc.
1948-60 North Ninth St., St. Louis
Jan. 29, 1937.

Gentlemen:

To the best of our ability, we will endeavor to answer the various questions asked in your letter of recent date, concerning our views on the trend of air-conditioning business this year.

1. We believe that the total volume of air-conditioning sales in the United States in 1937 should be close to \$50,000,000.

2. We expect to at least double our 1936 air-conditioning business in 1937.

3. We are inclined to think that the greatest increase will be shown in complete systems of air conditioning installed in old and new buildings.

Why Some Readers Don't Get the News 'Till Monday

Complaints regarding late delivery of the News registered recently by some subscribers (see "Letters" column, Dec. 23 issue) may be partially explained in a statement issued by Peter Wiggle, assistant postmaster of the Detroit Postoffice.

Delays in third class mail deliveries, the postoffice official states, have been due to a substantial increase in the volume of business now being done by the Detroit Postoffice, through which outgoing copies of the News pass on their way to other cities and states.

"The increase in our business," says Mr. Wiggle, "has been very noticeable, and we have been forced to handle our first and second class mail first. In addition, it has taken a little time to straighten out all the details of the new Roosevelt Park station, where the delay occurs, but we feel that by Feb. 1 we will have everything well in hand."

4. We feel that the "packaged" unit is going to be considered very much as a packaged unit heating plant; and that central systems will replace the packaged unit in most cases.

5. The popularization of cooling for human comfort has brought together two schools of thought in the air conditioning, heating, and ventilating field. The first group will include refrigeration people who are experienced in refrigeration work. The second group would include air handling and air distribution people, experienced in this line of work. There are very few instances where the two are combined in one organization or one individual. Since the refrigeration group are going ahead more rapidly than any others as contractors installing complete air-conditioning systems, we believe that there will be a greater demand for men experienced in air distribution and air handling.

6. A commercial refrigeration distributor who is competent to properly engineer and design air-conditioning systems should have a very bright future. However, "properly engineered and designed" covers a lot of territory; and a great many of the unsatisfactory comfort cooling air-conditioning systems have been put in by dealers in commercial refrigeration and dealers handling a line of "packaged" units who simply don't know the business.

7. Those organizations who operate nationally in the sale of air-conditioning equipment should first employ men with a background of experience in the engineering and sale of such apparatus. Since these two qualifications are rarely found in one man, it is usually better policy to hire an experienced and proven sales executive, and supply him with capable engineering ability in his staff. Such a man can build the proper sales organization. The method of doing business depends on the line in question—the operations are the same. If the organization knows what it is doing and is operating properly, the increased sales will automatically follow.

W. A. RUSSELL.

What Was Published About the School In Youngstown?

1125½ Morton St.
Alameda, Calif.

Editor:

Recently in response to advertising in this vicinity, I wrote the Refrigeration and Air Conditioning Institute, 2131-2158 Lawrence Ave., Chicago, to determine whether or not the above firm might in any way be associated with the Refrigeration Engineering Institute of Youngstown, Ohio. The latter so far as I know is still in existence.

Shortly after writing the Chicago firm in care of their local advertising address, a Mr. H. C. Brokaw called in response to my inquiry, and told me no connection exists between the two in spite of name similarities. Mr. Brokaw made a most favorable impression.

The foregoing is more or less incidental. What I precisely wish to know is this. Are there any copies of the AIR CONDITIONING AND REFRIGERATION NEWS available published during the latter part of 1935 or early 1936 in which an article appeared relative to the Refrigeration Engineering Institute of Youngstown, Ohio? Mr. tute of Youngstown, Ohio?

GEORGE W. FELL.

Answer: On page 12 of the March 25, 1936, issue of REFRIGERATION NEWS there was published, under the heading, "How About It, Dr. Klekner?" a publicity letter sent out by Dr. B. M. Klekner, head of Refrigeration Engineering Institute, Youngstown, telling about the staff of the school; a letter from F. M. Cockrell, publisher of the News, asking certain executives of manufacturing concerns who were listed as officials of the Institute to give us some information about the school; and the replies from some of those who received Mr. Cockrell's letter.

Georgia Power Co. Loses Suit Against TVA Cooperative

MARIETTA, Ga.—Action of Georgia Power Co. to obtain an injunction restraining North Georgia Electric Membership Corp., a rural electrification cooperative, from purchasing and distributing TVA power was overruled by Judge J. Harold Hawkins in Superior Court here.

The court held that the cooperative is not subject to the "jurisdiction, supervision, or control" of Georgia Public Service Commission, and is not engaged in illegal competition with Georgia Power Co. Application of the company for \$500,000 damages was denied.

Suit of the membership corporation against Georgia Power Co. for damages of \$1,000,000 and \$50,000 attorney's fees, charging unfair competition through intimidation of potential members of the cooperative, is still pending.

McGregor's Occupies New Building in Memphis

MEMPHIS, Tenn.—McGregor's, Inc., distributor of Frigidaire refrigeration and air-conditioning equipment, has leased the former Fred White Motor Co. building at 1071 Union Ave. here for warehouse and display purposes. The lease calls for immediate occupancy.

Sturtevant Co. Moves Columbus Office to Larger Quarters

COLUMBUS, Ohio.—The B. F. Sturtevant Co., manufacturer of ventilating and air-conditioning equipment, has moved its Columbus office to larger quarters in the Ohio State Savings building, according to A. E. Wollerman, Columbus manager.

This city is headquarters for the Ohio division.

Ralph Jenkins to Supervise Gar Wood Manufacturing

DETROIT—Appointment of Ralph S. Jenkins as vice president of Gar Wood Industries, Inc., in charge of manufacturing in all divisions of the company, was announced last week by Logan Wood, vice president and general manager.

Mr. Jenkins comes to Detroit from Minneapolis, where he was general manager of the St. Paul Hydraulic Hoist Co.

Maysteel Products Co. to Make Air-Conditioning Equipment

MAYVILLE, Wis.—The Maysteel Products Co. has begun the manufacture of air-conditioning equipment, radiator and ice box cabinets here. The new company took over the plant formerly occupied by the Wisconsin Radiator Furniture Corp.

the reactions of the subjects were recorded at frequent intervals.

In the second type of test, the subjects after a brief walk out-of-doors recorded his feeling of comfort, degree of perspiration, body temperature and other reactions before entering the conditioned room, and again immediately upon entering, and at frequent intervals thereafter, while the temperature and humidity of the atmosphere in the room were kept constant.

These subjects participating in this phase of the study were normal, healthy, college students, ranging in age from 19 to 25 years. Subjects were only accepted for the study after undergoing a medical examination, in order to eliminate those who might be abnormal in any way, particularly as regards their temperature regulatory reactions.

"For the Toronto subjects entering the tests with coats the maximum percentage of comfort occurred at about 69° effective temperature, effective temperature, while for subjects entering without coats, the highest percentage of comfort was found at from 71 to 73°, indicating that comfort is realized at from 2 to 3° effective temperature higher when no coat is worn," Mr. Houghten reported.

"The result of tests in Texas show a maximum percentage of 88% of the subjects indicating comfort at 73° effective temperature, while over 50% of the reactions were comfortable over an effective temperature range from 69.5 to 74.5° F. The results of tests in Pittsburgh show maximum percentage indicating comfort at between 72 and 73° effective temperature, with more than 50% of the subjects indicating comfort between 68 and 75° F."

In order to compare the reactions

of the subjects more easily, their comfort ratings are plotted against effective temperature. The percentages giving a rating of ideal comfort are plotted for each study in Fig. 1.

While there is considerable variation between the three curves in the three phases of the study, particular significance is attached to the fact that maximum comfort was indicated in the Toronto study at approximately 70° effective temperature, while in the Pittsburgh and Texas studies maximum comfort was indicated at 72.5 and 73.0° F. effective temperature respectively, Mr. Houghten pointed out.

The one-half degree variation in maximum comfort between the latter two studies is not considered to be significant, and for all practical purposes they may be considered as the same. Some significance may, however, be attached to the fact that the lower limit of comfort in the Pittsburgh study was at a lower effective temperature than that for the Texas study. On the other hand, this difference of approximately 1½° may result from the greater number of subjects in the Pittsburgh study.

For comparison, a similar curve resulting from a study of the comfort zone in Boston by Professor Yaglou in July, August and September of 1927 is also plotted. The close relation between this curve and that resulting for Toronto in this study may be due to the similarity of the summer temperature.

"From the three curves giving a comfort feeling a comfort zone for each of the three districts may be established if agreement may be had on the percentage of persons who should be expected to be ideally comfortable in a conditioned space," said Mr. Houghten.

(Continued on Page 16, Column 3)

— AIR CONDITIONING ENGINEERING —

Houghten Gives Test Data at ASHVE Meeting on Research Studies of Reactions to Summer Cooling

BY F. O. JORDAN

ST. LOUIS—"Cooling Requirements for Summer Comfort Air Conditioning," the paper presented by F. C. Houghten, director of the A.S.H.V.E. Research Laboratory, at the A.S.H.V.E. annual convention here last week, is of particular interest to the present day summer comfort air-conditioning engineer because it is based upon actual test data obtained upon a subject regarding which most available information heretofore has been based upon unconfirmed impressions, prejudices and rumors, and because the conditions

maintained within the conditioned space have a tremendous influence, not only upon human comfort, but also upon both the first and operating costs of air conditioning.

However, judging from the storm of written and verbal protests which was hurled from all angles about the ears of the A.S.H.V.E. Committee on Research, even before the echoes from the reading of the paper had ceased to reverberate, it appears doubtful if the findings of the paper proved anything in the minds of many of the audience.

As the defenders of the committee pointed out, one should at least consider the findings of the committee with an open mind, and should not place more credence upon mere opinion based upon hearsay, or at best upon haphazard impressions, than upon tested data fresh from the laboratory. For, as pointed out, testing subjects who are aware of the test conditions is practically meaningless because of the almost unbelievable influence of one's imagination upon his physical sensations.

For example, if you belong to the school of thought which holds that high humidity is uncomfortable regardless of effective temperature, you doubtless will note poignant pangs of discomfort when you occupy a room in which you already know the humidity to be high—even though the humidity is low.

One protestor thought that all comfort tests should be conducted with morons as subjects, in order to eliminate the imaginative strain, normally associated with the acute intellect. The obvious difficulty in that method, however, is that it calls for someone capable of drawing such fine distinctions. In other words, who says who is a moron?

The following are the general theories regarding summer comfort, held not by the public at large, but by various air-conditioning "experts" who know all about their business:

1. That comfort depends primarily upon humidity, which therefore must be held within narrow limits. 1A. That humidity has practically nothing to do with comfort; that comfort depends only upon effective temperature, or upon dry bulb temperature, or upon wet bulb temperature, or upon the digestive organs.

2. That no outside air need be admitted. 2A. That 100% of outside air must be circulated.

3. That the air stream must be directed upon the occupants. 3A. That the air stream must not be directed upon the occupants.

4. That "shock" upon entering the conditioned space is caused by low dry bulb temperatures. 4A. That "shock" upon entering the conditioned space has nothing to do with dry bulb temperatures, but is the result of the rapid drying of perspiration due to low relative humidity.

In order to throw the light of

truth upon the above ideas, the ASHVE has conducted tests upon the following points:

1. Desirable atmospheric conditions as regards temperature and humidity in still air for comfort in summer air conditioning, together with any variation in these requirements for different geographical regions having different weather conditions.

2. Allowable variations in the relative humidity of the air with optimum conditions of effective temperature, and any variation in the time required for the disappearance of sensible perspiration with variations in the moisture content of the air.

3. Variation in the required effective temperature for comfort depending upon the age, sex and general health conditions of the person involved.

4. The effect of the amount of clothing worn, particularly the effect of coats worn by men, on the desired effective temperature.

5. The effect of air velocities, above those usually used in air conditioning, on the cooling requirements.

6. The characteristics and seriousness of the cold shock felt upon entering a cooled space in the summer, together with the duration of the shock and the subsequent physiological reactions or sensations up to the time when complete comfort is established.

7. The physiological reactions and sensations of a person leaving a cooled space and re-entering the hot outside and the duration of these reactions."

"RELATION BETWEEN THE DESIRED EFFECTIVE TEMPERATURE FOR SUMMER COMFORT AIR CONDITIONING AND THE WEATHER CONDITIONS OF DIFFERENT GEOGRAPHICAL LOCATIONS."

In order to indicate the degree to which different geographical locations with different weather conditions affect the indoor cooling requirements for summer air conditioning, three distinct studies were carried on during the past summer:

1. A brief study was carried on by the Ontario Research Foundation, Toronto, Ontario.

2. A similar study was carried on by the Engineering Experiment Station of the Agricultural and Mechanical College of Texas, College Station, Texas.

3. This and other phases of the subject outlined above were studied by the Research Laboratory of the Society in Pittsburgh.

The Toronto study was made during July, and the Texas study during July and August. The Pittsburgh study as regards this phase of the subject was made at intervals during the latter part of June, July, August and the early part of September. Included in the results analyzed in this phase of the subject are data

from the similar study made and reported last year.

In each case, an inside, well-insulated room was equipped so that it could be cooled, with provisions for controlling at will the atmospheric conditions. Tests of two general types were made in each instance.

In one type of test the atmospheric conditions in the test room were made to vary slowly over a period of time along a predetermined course when plotted on the psychrometric chart, in order to traverse the probable comfort zone, or some portion thereof. The usual practice was to bring the subjects to equilibrium with a predetermined constant condition within the test room after which the condition was made to vary slowly, while

SHE'S GOT

Everything

including ice-cubes for the drink that pleases "him"

Ice-cubes—always available—without bother or fuss—no wonder the modern hostess is such a care-free, charming young lady. In a thousand ways automatic refrigeration makes living safer, finer, more gracious.

And the modern girl will be completely satisfied with the operation of her refrigerator if the manufacturer has used Extra Dry ESOTOO or V-METHY-L in it. Manufacturers and service engineers know they can depend on the purity and dryness of Extra Dry ESOTOO and V-METHY-L. They also know it is available for immediate delivery.



VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA

Relation between Effective Temperature & Comfort

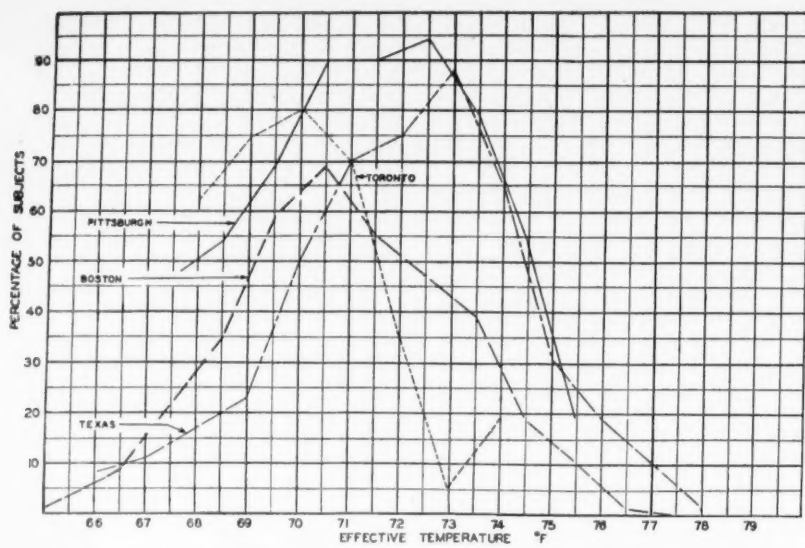


Fig. 1—Chart showing relation between effective temperature and percentage of subjects indicating feeling of ideal comfort as shown by tests in Toronto, Pittsburgh, Texas, and Boston.

A BUSINESS OPPORTUNITY

SOMEWHERE in your community there is a refrigeration distributor who knows he can increase his business volume and profits by adding a new line of quality products. Perhaps at the present time, he is looking for an uncrowded, new field through which to increase his profits.

This distributor may have in the past pioneered in the refrigeration field. He knows that he can do it again in a new field which is just now in its infancy—but which has tremendous possibilities.

To this distributor we offer an unusual opportunity with a complete line of thoroughly tested and recognized high quality Automatic Heat and Air-Conditioning equipment. He will be interested in our aggressive sales, merchandising and advertising plan. He will also appreciate the acknowledged leadership we have built in the Heating, Ventilating and Air-Conditioning industry since 1907.

Only those with proper financial background and marketing ability will be considered. To a distributor of this type, who is willing to add a new division under a competent and experienced sales head, an exclusive franchise for Herman Nelson Automatic Heat and Air-Conditioning equipment in a sizable marketing area will be granted.

For complete information write to

The HERMAN NELSON CORP.
Moline, Illinois



Effective Temperature Varies with Climate, Researchers Find

(Continued from Page 15, Column 5)
"If 70% of all persons occupying a conditioned space should be comfortable, then the Toronto study indicates a comfort zone from a little below 68.5 to 71° effective temperature.

"The Pittsburgh study indicates a zone ranging from 69.5 to almost 74°, while the Texas study indicates a range from 71 to 74° F. Keeping in mind the fact that maintaining a higher temperature results in greater economy in cooling, and also the fact that with higher effective temperatures the cold shock upon entering a conditioned space is diminished, it seems desirable to recommend for general use temperatures nearer the upper limits rather than the lower limits of these ranges.

"This would seem to indicate an effective temperature of 70 or 71° for Toronto, and about 73° for Pittsburgh and Texas.

"This would also indicate that all localities having a summer condition as warm or warmer than Pittsburgh should use summer cooling effective temperature of about 73°, while for cooler climates with lower mean summer temperatures, lower effective temperatures should be maintained."

VARIATION IN RELATIVE HUMIDITY AT A GIVEN EFFECTIVE TEMPERATURE.

The study made in Pittsburgh during the summer of 1935 included a few tests which indicated that over a considerable range, variations in relative humidity did not affect the feeling of warmth, provided the proper effective temperature was maintained. This phase of the study was not, however, conclusive and the inference was the subject of considerable debate among those discussing the subject. Accordingly a large part of the work in Pittsburgh during the past summer was directed toward clearing up this point. A series of 52 tests were made all at 73° effective temperature, and with variations in relative humidity from 30 to 90%.

"The most important effect of the moisture content of the air is its reaction on the feeling of warmth; however, it is recognized that it may have other important, though possibly more subtle, consequences," Mr. Houghten explained.

"In this study, importance was placed primarily on its effect on the feeling of warmth. An attempt was made, however, to obtain the opinions of those participating in the test regarding other reactions experienced, as well as their general impression of conditions.

"The air-conditioning equipment in the laboratory at Pittsburgh is not well adapted to maintain relative humidities above 80% at dry-bulb temperatures above 70° during the summer, and in order to obtain these conditions it was necessary to augment the regular air-conditioning system by admitting steam and spraying

(Continued on Page 17, Column 3)

Value of Installation Surveys

If one were to ask a sales executive to name the factors in a complete survey on the use of a particular product or piece of equipment, he would probably list the factors as follows: name, address, and type of place in which the equipment is installed; make of equipment installed; size or value of the equipment; and date of purchase, or date of installation.

On very few products have such records been available. Even in cases where this information was obtainable, there has generally been no central, unbiased agency to keep such records.

Through the good offices of the power companies in some cities, however, such complete records have been kept on the use of air-conditioning systems.

Utility companies, alert to the possibilities of air conditioning as a load builder, have played a most helpful role in keeping tab on instal-

lations made in the communities which they serve; keeping records on the number and size of the installations made in the various market classifications, and in some instances getting information on all the factors which the sales executive would like to see in a model survey.

Through the cooperation of the power companies which keep such records Air Conditioning and Refrigeration News is publishing "complete user market data" on air-conditioning installations in a number of major cities.

While these surveys occupy considerable space in its editorial columns, Air Conditioning and Refrigeration News believes that this information is of considerable interest and value to its readers, particularly in view of the fact that to the editor's knowledge, information of this type is available in no other trade periodical serving the air-conditioning field.

- AIR CONDITIONING SURVEYS -

Mississippi Power & Light Co.

Banks

Name and City	Make	Tonnage	Hp.
During 1935			
Capital National Bank, Jackson		36	50
During 1936			
City Bank & Trust Co., Natchez	General Electric	1	1

Beauty Shops

Prior to 1935			
Birdie Hunter Beauty Parlor, Vicksburg..		6	6
During 1935			
Art Beauty Salon, Jackson		3	5

Doctors & Dentists

During 1936			
Dr. Frank Hagaman, Jackson	York	5/8	1
Dr. H. R. Shands, Jackson	York	5/8	1
Dr. E. F. Butler, Greenville	Frigidaire	1 1/2	1
Dr. T. E. Wilson, Jackson	Frigidaire	5/8	1
Dr. Norman Applewhite, Jackson	York	5/8	1
Dr. Lonnie Moseley, Jackson	Frigidaire	5/8	1

Hospitals

During 1936			
Baptist Hospital, Jackson	Frigidaire	5	5
Baptist Hospital, Jackson	York	5/8	1
Baptist Hospital, Jackson	York	5/8	1

Industrial Applications

During 1936			
Lanes Creamery, Jackson	York	2	2
Seale-Lily Ice Cream Co., Jackson	Frigidaire	1	1 1/2
During 1935			
Jackson Steam Laundry, Jackson		5	5

Laboratories

During 1936			
U. S. Soil Laboratory, Vicksburg	York	5/8	1

Miscellaneous

Prior to 1935			
Jitney Jungle No. 14, Jackson		10	11
Miss. School Supply, Jackson		3	4
Niles Moseley, Jackson		1	1
Gardners Dry Cleaners, Greenville		1	1
Capital Chevrolet Co., Jackson		1	1
Sellers Motor Co., Jackson		1 1/2	1 1/2
U. S. Government Fleet, Vicksburg		2	2
During 1935			
Gerard Chevrolet Co., Winona		5/8	1
During 1936			
W. H. Wall Press, Shop, Drew	Frigidaire	3	3
Jitney Jungle, Jackson	Carrier	16	22

TIMKEN TAPERED ROLLER BEARINGS

TIMKEN, TAPERED, ROLLER BEARINGS have been proven by years of use in leading American automobiles. In your CURTIS COMPRESSOR, special, sound-proof type Timken Bearings add to the efficiency, smooth operation and long life. Unlike other types of anti-friction bearings, they provide for easy outside adjustment for wear if necessary.

Timken Tapered Roller Bearings are another example of the advanced engineering that contributes so much to efficiency and care-free performance of the CURTIS Condensing Unit.

Represented in Canada by
Canadian Curtis Refrigeration Co., Ltd.
20 George St., Hamilton, Ontario

CURTIS

CURTIS REFRIGERATING MACHINE COMPANY
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue, St. Louis, Mo.

Mississippi Power & Light Co. (Cont.)

Offices

Name and City	Make	Tonnage	Hp.
Prior to 1935			
McColgan Bldg. Loan Assn., McComb.....		3	3½
Miss. Power & Light Co., Jackson.....		½	¾
During 1935			
Gamble Bros. & Montgomery, Greenville..		1	1
Miss. Power & Light Co., Vicksburg.....		½	¾
R. D. Saunders, Jackson.....		½	1
R. D. Saunders, Jackson.....		1	1½
Brady Dean & Hobbs, Brookhaven.....		¾	1
During 1936			
J. P. Davis, Jackson.....	Carrier	¾	1
E. O. Spencer, Jackson.....	York	1	1½
Kelly Patterson, Jackson.....	Carrier	¾	1
McCarty-Holman, Jackson.....	Carrier	10	13
E. O. Spencer, Jackson.....	York	¾	1
E. W. Reid, Magnolia.....	Frigidaire	¾	1
H. Seale, Jackson.....	Servel	½	¾

Residences

Prior to 1935			
B. F. Floyd, Como.....		1	1½
W. B. Swain, Holly Knowe.....		1½	1½
Edmond Taylor, Greenville.....		1½	1½
Dr. Lawrence Clark, Vicksburg.....		¾	¾
E. V. Grierfield, Vicksburg.....		¾	¾
Dr. T. B. Lewis, Greenville.....		1½	1½
During 1935			
R. M. Dakin, Cleveland.....		¾	1
George Miller, Vicksburg.....		½	¾
Edwin Byrne, Natchez.....		½	¾
P. K. Lutkin, Jackson.....		2	2½
Jack Walker, Vicksburg.....		¾	1
During 1936			
Dr. H. R. Shands, Jackson.....	York	¾	1
LeRoy Parish, Lexington.....	Airtemp
Dr. J. R. Harvey, Moorhead.....	York	¾	1
Dr. J. K. Avant, Grenada.....	York	¾	1
T. B. Revell, Grenada.....	Frigidaire	¾	1
L. N. Fischel, Vicksburg.....	Frigidaire	1½	¾
Mrs. Mary Gerard, Winona.....	Frigidaire	¾	1
S. N. Sutton, Jackson.....	Frigidaire	¾	1
J. W. Dixon, Natchez.....	General Electric	1	1
G. A. Wilson, Cottondale.....	Airtemp	2	2
W. S. Dixon, Ruleville.....	Airtemp	3	3

Restaurants & Hotels

Belmont Cafe, Jackson.....		15	20
Grenada Hotel Coffee Shop, Grenada.....		3	3
During 1936			
Walshall Hotel Coffee Shop, Jackson.....	York	15	18
Greenville Hotel Coffee Shop, Greenville..	York	10	12
Grenada Hotel, Grenada.....	Airtemp	1½	¾
Grenada Hotel, Grenada.....	Frigidaire	1	1
Walshall Hotel, Jackson.....	York	2½	2
Venice Cafe, Vicksburg.....	Frigidaire	14	15
Walshall Hotel, Jackson.....	Carrier	1½	2
Burton's Cafe, Jackson.....	Carrier	35	48

Stores

Prior to 1935			
Tonkels Dept. Store, Greenville.....		1	1
During 1935			
O'Neill-McNamara Hdwe. Co., Vicksburg..		3	5
Koestler Bakery, Vicksburg.....		3	3
During 1936			
Adeles House of Fashion, Vicksburg.....	Frigidaire	1½	¾
Liggett's Drug Store, Jackson.....	Carrier	13	18

Tennessee Electric Power Co.

Banks

Name and City	Make	Hp.
American National Bank, Nashville.....	Carrier	40

Beauty Parlors

Vogue Beauty Shop, Columbia.....	Frigidaire	3.25
----------------------------------	------------	------

Clubs

Elk's Club, Nashville.....	Frigidaire	12.5
----------------------------	------------	------

Broadcasting Studios

WSIX, Nashville.....	Frigidaire	3.5
WSM, Nashville.....	Carrier	15

Hospitals

P. & S. Hospital, Cleveland.....	Frigidaire	2.5
----------------------------------	------------	-----

Miscellaneous

D. D. Canfield, Laundry, Nashville.....	Carrier	1
United Jewelry Co., Nashville.....	General Electric	5.5

Hotels

Hermitage Hotel, Nashville.....	Carrier	1
Hermitage Hotel, Nashville.....	General Electric	1
Andrew Jackson Hotel, Nashville.....	General Electric	30.5

Theaters

Knickerbocker Theater, Nashville.....	Carrier	72.5
---------------------------------------	---------	------

Perspiration Removal
Little Affected by
Humidity in Tests

(Continued from Page 16, Column 3)
water into the test room. These applications frequently resulted in steam and other odors and the appearance of fog in some parts of the room.

"Probably as a consequence of these disturbances, the subjects frequently indicated their displeasure with the high humidities supplied, although they admitted it had nothing to do with their feeling of warmth. This phase of the subject should be given further study.

"In order to eliminate the effect of the variable outside temperature, about one-half of the tests were made with the subjects entering the test room from a nearby, artificially heated room, instead of from the outside. In these tests the test room was always maintained at 87° effective temperature with from 50 to 60% relative humidity. The subjects remained in this hot room approximately 15 min., or in the case of each individual subject, until his feeling of warmth reached the level of 'hot.'

"This had the effect of giving a series of tests in which the variable effect of outside weather was eliminated. In all cases the subject entered the test room immediately after recording his feeling of warmth, degree of perspiration, and body temperature.

"The feeling of warmth and degree of perspiration were again recorded immediately after entering the test

(Concluded on Page 18, Column 1)

Offices

Name and City	Make	Hp.
R. C. Jones & Sons, Chattanooga.....	Frigidaire	3.1
Provident Life Ins. Co., Chattanooga.....	Frigidaire	1
American Trust & Banking Co., Chattanooga	Frigidaire	3.55
Southern Chemical Cotton Co., Chattanooga	Frigidaire	1.5
Hermitage Mills, Nashville.....	Frigidaire	8.5
Hardwick Stove Co., Cleveland.....	Frigidaire	12.5
Murfreesboro Bread and		
Ice Cream Co., Murfreesboro.....	Frigidaire	.75
Lewis & Co., Inc., Nashville.....	Carrier	1
George Hern, Nashville.....	Carrier	1
May Hosiery Mills, Nashville.....	York	30

Residences

J. R. Hedges, Chattanooga.....	Frigidaire	6
William Hume, Nashville.....	Frigidaire	.75
Dr. R. M. Case, Nashville.....	Frigidaire	.6
W. N. Easten, Nashville.....	Frigidaire	1
Charles Cohen, Nashville.....	Frigidaire	1
T. W. Newberry, Cleveland.....	Frigidaire	.5
H. H. Swink, Harriman.....	Frigidaire	.33
J. W. McMillan, Harriman.....	Frigidaire	.6
W. W. McMaster, Harriman.....	Frigidaire	.6
Hans Roesler, Murfreesboro.....	Frigidaire	.6
Sam Hutcheson, Chattanooga.....	Westinghouse	1.6
H. Z. Lipscomb, Nashville.....	Strang	1.5
Newman Cheek, Jr., Nashville.....	Carrier	1

Restaurants

Read House Dining Rooms, Chattanooga...	Frigidaire	28.5
Patten Hotel Coffee Shop, Chattanooga.....	Frigidaire	14
T. & K. Sandwich Shop, Nashville.....	Frigidaire	5.5
Eat-A-Bite Cafe, Nashville.....	Servel	11
Zanini's Restaurant, Nashville.....	Servel	8.2
Satsuma Tea Room, Nashville.....	York	11.5

Stores

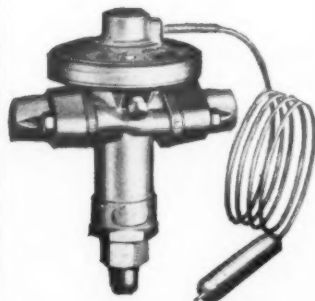
Weinberger's, Nashville.....	Frigidaire	12.25
Kress Bldg., Nashville.....	Carrier	156.5
Klein's Dept. Store, Nashville.....	York	16.5
Rich, Swartz & Joseph, Nashville.....	York	40
Fox Apparel Shop, Nashville.....	Carrier	8.5
Sears Roebuck Co., Nashville.....	York	209
F. W. Woolworth, Nashville.....	York	95
Pickett's, Inc. (Ladies' Ready-to-Wear)		
Chattanooga.....	Frigidaire	28.5
Candy's, Inc. (sales floor), Nashville.....	Frigidaire	3
Baker's Shoe Store, Chattanooga.....	York	10
Ames, Inc. (ladies' ready-to-wear),		
Chattanooga.....	York	9.6
Chandler Shoe Store, Nashville.....	Carrier	8.5
Kay Jewelry Co., Nashville.....	Carrier	5.5
Walgreen Drug Co., Nashville.....	Carrier	18.5
Liggett Drug Co., Nashville.....	Carrier	18



MODEL 210



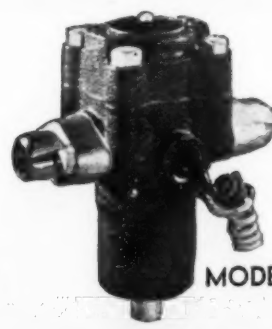
MODEL 215



MODEL 220-K



MODEL 70-N






MODEL 78




MODEL 73-R

REFRIGERANT
CONTROLS
that defy leakage


In the field of modern refrigeration and air conditioning applications,  Refrigerant Controls stand out unmistakably as the logical choice of those who recognize the value of uninterrupted performance.

Leakproof safety and trouble-free service are outstanding factors in the overwhelming preference which is swinging to  Controls. Through every stage of its production, from the forged brass body to the completed assembly, every  valve must pass the scrutiny of a battery of fault-finders before it is permitted to carry its serial number.

 Thermostatic Expansion Valves are now available in a complete range of sizes up to 15 tons Freon capacity.

Address inquiries
to our new location
2450 N. 32nd Street



PROGRESSIVE JOBBERS
EVERYWHERE STOCK
 CONTROLS

TAG SNAP-ON CONTROLLERS
For Service Replacement profits

The four essentials of any refrigeration controlling device are fully met in TAG's Snapon Control Type R-7 shown here. The construction is the simplest of any on the market. The current carrying and movable parts are sufficiently rugged so that the R-7 will frequently outlive the units it serves. Its accuracy has been proven in many breakdown tests by the nationally known manufacturers who use it. And, in appearance it bespeaks its solid utility and faultless operation.

Ask for a copy of the new TAG Catalog No. 1136-25 which describes the R-7 and other Refrigerator Service Equipment you should have available.

C. J. TAGLIABUE MFG. CO.
Park & Nustrand Ave., Brooklyn, N. Y.



Problem of 'Cold Shock' Studied By ASHVE

(Concluded from Page 17, Column 3) room and at frequent intervals thereafter during the period of the test, which lasted until all of the subjects reached a condition of comfort.

"The results for the five different relative humidities show no measurable progressive change from lower to higher moisture content of the air. The results as drawn from the data show that 10.5, 16.5, 16, 15 and 14 and 14 minutes were required for sensible perspiration to disappear in atmospheres of 73° effective temperature and 30, 50, 70, 80 and 90% relative humidity, respectively, when a perspiration rate of 'just visible' pertained before entering the test room from the outside.

"Similarly, 8, 10.5, 10.5, 10 and 8.5 minutes were required for the disappearance of sensible perspiration from the subjects in atmospheres of 73° effective temperature and 30, 50, 70, 80 and 90% relative humidity, respectively, after entering the test room from the hot room with the same sensible perspiration rate.

"Observations showed that in a number of cases perspiration lingered slightly longer in atmospheres of 80 and 90% relative humidity than in lower humidities.

"It must be kept in mind that the disappearance of sensible perspiration is more than an ordinary drying process. The disappearance of perspiration must be greatly affected by the time necessary for the body to cease exuding perspiration after entering an atmosphere of lower temperature.

"Also, the evaporation of perspiration from the body of a person is effected both by the temperature and moisture content of the air and the temperature of the body itself.

"Since the surface temperature of the body, even when under the greater cooling rate met with in the cooled atmosphere, does not fall greatly, the vapor pressure of the moisture on the surface is considerably higher than the vapor pressure of the atmosphere at 73° effective temperature with either high or low relative humidity.

"From this point of view, the apparent insignificance of the change in disappearance of perspiration with change in relative humidity becomes less surprising. Further study of this phase of the subject is recommended.

"One should expect to find a significant correlation between the degree of perspiration before entering a cooled atmosphere and the time required to reach comfort after entering. A similar correlation should be expected between the feeling of warmth before entering a cooled atmosphere and the time required to reach comfort after entering. However, the data obtained shows no significant correlation.

The relation between the cold shock or the feeling of discomfort immediately after entering a cooled atmosphere, at 73° effective temperature with various relative humidities, and the degree of perspiration on the body before entering on the one hand, and the feeling of warmth before entering the conditioned space on the other was studied.

"It was found that the cold shock upon entering a cooled space increases with the degree of warmth and the degree of perspiration experienced before entering. There is no noticeable variation in these relationships for tests made at different relative humidities and 73° effective temperature, proving rather conclusively that the cold shock upon entering a cooled space is independent of the relative humidity at a given effective temperature."

EFFECT OF AIR MOTION

"A few tests were made with from three to five subjects to determine the desired temperature for comfort with higher than normal air velocities," explained Mr. Houghton.

"These tests were made late in the season, and sufficient data for drawing any definite conclusion were not obtained. Based upon these indications, an air velocity of 75 f.p.m. results in comfort with 82° F. dry-bulb at 50% relative humidity, and with 78° F. dry-bulb at 80% relative humidity.

"The subjects endured air velocities up to 150 f.p.m. for periods up to one hour without complaint. Velocities above 150 f.p.m., even for periods of 15 or 20 minutes were found objectionable, while velocities from 100 to 150 f.p.m. for periods of over an hour become irritating and unpleasant."

SHOCK UPON ENTERING OR LEAVING A COOLED ATMOSPHERE.

"The plans outlined for the investigation by the Technical Advisory Committee on Comfort Requirements for Summer Cooling included a more intensive study of the cold shock upon entering a conditioned space,

and the reaction upon re-entering the hot outside.

"Time was not available for any specific tests on this phase of the subject; however, occasional observations while making the studies reported above, and analyses of a few tests available at different effective temperatures, indicate quite clearly that the severity and length of the cold shock increases rapidly as the effective of the cooled space is lowered, pointing to the desirability of maintaining as high an effective temperature indoors as will give comfort, or an effective temperature in the upper region of the comfort zone," Mr. Houghton summarized.

"While few observations were made on the effect of the reaction upon re-entering the hot outside from the cooled space, it was apparent that the reaction decreased with a higher effective temperature maintained indoors. The few observations made, together with the general reactions and opinions of the subjects taking part in the tests, indicate no very severe reaction, and it is believed that the objection frequently directed to air conditioning because of this reaction is largely psychological.

"The subjects never complained of

discomfort during the hours following a cool test other than for the short period mentioned above, excepting that their greater comfort during the test period emphasized the discomfort resulting from the hot outside atmosphere."

Electrode Maker Credits Better Quality, Higher Speed to Conditioning

CLEVELAND—George A. Maurath, Inc., local manufacturer of electrodes for welding heat-resisting stainless alloy steels, has found that air conditioning materially improves the quality and uniformity of the product and increases the speed of production.

Application of a special chemical flux to these electrodes during the final stages of manufacture is materially aided by maintenance of proper temperature and humidity, the company has found.

The equipment installed for this purpose was sold by P. C. DeVries of the Cleveland office of York Ice Machinery Corp., and consisted of a model FB-800 industrial coil type air conditioner, and a 4 by 4 inches ammonia compressor. Temperature and humidity controls were provided.

Satisfied with the performance of this air conditioning unit, Mr. Maurath decided to condition his office also, and installed a model B-275 air conditioner and a 424-FW Freon-12 condensing unit. This system is arranged for complete summer and winter conditioning.

Carrier Engineers Discuss Developments in Industry

ATLANTA—Developments in the air-conditioning industry were discussed by engineers of the southern and southeastern division of the Carrier Corp. at a special meeting in the Hotel Ansley, Atlanta, on Monday, Jan. 25.

Walter A. Bowe, advertising and sales promotion manager; William H. Price, vice president in charge of sales; and John N. Bickel, merchandising manager, all of the Carrier Corp., addressed the meeting.

Meier to Increase Air Conditioning Activity

INDIANAPOLIS, Ind.—Sales force of the Meier Electric and Machinery Co., Indianapolis Nash-Kelvinator distributor, has been expanded preparatory to broadened air-conditioning activity this year, Frank L. Meier, president, announces.

— AIR CONDITIONING MADE EASY —

Combining Hot Air & Direct Radiation In Split Systems; Boiler Design

SECTION NO. 7

Heating

BY F. O. JORDAN

Split Systems

The heating systems which have been explained in the foregoing paragraphs have been based upon the use of either steam or hot water direct radiation, or upon the use of hot air. In the "split" system, the use of direct radiation and hot air is combined.

In some cases, the "split" in the system is in respect to the entire building, that is, certain rooms are heated entirely by hot air circulation, while other rooms are heated entirely by direct radiation. By placing direct radiation in bath rooms, kitchens, garages, etc., contamination by these rooms of the remainder of the building may be avoided.

In other cases (generally in schools and other large buildings requiring considerable ventilation) the "split" in the system is in respect to the individual rooms themselves, that is, the same room may be heated by circulated air and by direct radiation, simultaneously. In such systems, the direct radiation generally is installed with sufficient capacity to balance transmission losses, while the air is supplied as necessary for ventilation, and at a temperature high enough to offset losses due to air change or infiltration, or only a few degrees above room temperature.

With such systems, uniform temperatures may easily be maintained in the various rooms regardless of varying load periods, as the input from the radiators may be regulated to suit the load without disturbing the air supply.

Under conditions of exposure such that certain rooms are heavily loaded, while other rooms are lightly loaded, the radiators in the former rooms may be operating at full capacity and the radiators in the latter rooms may be shut off entirely, while air is supplied at full volume to all rooms, without danger of overheating because the air supply temperature is little above room temperature.

With such systems it is advisable to provide extra coil capacity in connection with the air supply system, so that air can be supplied at 110° to 120° F. in order to shorten the heating up period after the over-night shutdown.

Design of Systems

Data for use in designing any of the above systems is given in Section No. 21, while detailed descriptions of design methods and of the applications of the design data are given in Section No. 20, 20A, 20B, and 20C.

Boiler and Furnace Design

While the field engineer may never engage in the design of the equipment itself, it is necessary that he be familiar with the essential elements of design if he is to judge and select

equipment, in turn, demands other features, as follows:

1. Ample air must be provided for complete combustion (1 cu. ft. per 25 to 30 B.t.u. boiler capacity) in such a manner that complete mixing may be accomplished.

However, if too great a surplus of air is provided, the temperature in the combustion chamber will be lowered below the point of good combustion.

2. The shape of the combustion chamber must be such, or proper baffles must be provided, that stratification is prevented and a thorough mixing is obtained.

3. Ample space must be provided so that complete combustion has time to occur before coming in contact with the relatively cool heating surfaces before the gases become chilled below the temperature demanded by good combustion, and/or refractory surfaces or baffles at incandescent temperature must be provided for lengthening gas travel and maintaining the gas temperature at the required level.

Since the time required for combustion varies with different fuels, the combustion chamber volume required for a given capacity depends somewhat upon the fuel to be used, the greater volume being required for the more highly volatile fuel. Thus coke, anthracite, or semi-bituminous coals require less combustion space than bituminous coals.

(Concluded on Page 19, Column 1)

CONDENSERS... EVAPORATORS

The dependability of 33 years specialized experience is back of Long condensers and evaporators (domestic and commercial) for electric refrigeration and air conditioning applications. Complete experienced engineering cooperation available • Long Mfg. Division Borg-Warner Corporation—Detroit, Michigan & Windsor, Canada

LONG

ALL IS WELL WHEN YOU USE ANSUL REFRIGERANTS

SULPHUR DIOXIDE

METHYL CHLORIDE

THE ANSUL TWINS PURE SAFE DRY

ANSUL CHEMICAL COMPANY
MARINETTE WISCONSIN

New Duct-Design Method Proposed for Residence Conditioning Systems

By F. O. Jordan

ST. LOUIS—Dealing particularly with the design of the air distribution system for the residence, the paper "A Rational Method of Duct Design," presented at the annual meeting of the A.S.H.V.E. here last week by Prof. L. G. Miller, head of the department of mechanical engineering, Michigan State College, purported to present an easily understandable method of designing the residential duct system which will result in well-balanced installations.

The author states that the method described in the paper is a combination of the commonly used "Velocity" and "Friction Pressure Loss" methods of duct design.

Briefly the method is to sketch a "single line" layout of the proposed system, to "select by inspection the duct appearing to have the least unavoidable resistance and design it for the highest usable velocity," and to so size the other duct branches,

that the friction loss through each run is the same.

The author states that the velocity for the run which is chosen as the basis of design should be about 750 f.p.m. for the vertical wall stack, and 1,000 f.p.m. for the horizontal duct. The cross sectional area of this particular branch duct is then computed by dividing the above velocities into the air quantity to be passed per time interval through this branch.

The air friction through the branch is computed from any suitable air friction table or chart, and the same table or chart is used for sizing other branches, taking into consideration the air quantity to be passed through each branch, so that the air friction loss is the same through each.

In the conclusion the author makes the following statement:

"The ultimate aim is to be able to so design the system that it will reduce the amount of artificial friction, viz. dampers, splitters, etc. to a minimum if not entirely to zero. It is believed that the cost of power consumed by such artificial resistance will in most cases more than offset the cost of investment in more ample

duct sizes. This is the reasoning involved in the method proposed. It is hoped that results will be commensurate with the slightly more involved plan of approach."

When devising a method for use in designing the residential duct system, it is well to consider the following two points:

1. Although the residential system often is more complicated than the air distribution system for much larger buildings, the cost is so much less that most residential work cannot bear the financial burden of any considerable amount of special engineering service.

2. Regardless of the way the engineer may feel about the matter, the great majority of residential duct design is done by non-technical furnace installation men.

For these two reasons, any method of residential duct design must be as simple as is commensurate with insuring a system which is satisfactory to the occupant of the residence, who, after all, knows nothing about any small increments or power which may be consumed by the "artificial resistance" of splitters.

into the "riveted" and the "welded" types. Heating boilers may be either type of construction, with the welded type considerably in the lead. One of the most common types of heating boiler is the portable fire box type, and recently its use has increased at the expense of the cast iron boiler.

In general, the principles and features described above as governing good boiler design and fabrication also apply to the direct fired furnace which is used for the warm air heating system. The same principles of combustion chamber design must be followed. Ample grate area and heating surface are of equal importance, while general serviceability, etc., must receive proper attention.

Since the warm air furnace is used for heating air rather than water, design and construction must be such that there is a good circulation of air over the opposite side of the heating surface from that exposed to the hot gases in order to obtain the required air-heating capacity and prevent the temperature of the heating surface from rising to a level which would be injurious to the furnace construction.

Approximately 1 sq. ft. of radiating surface must be provided for 1,500 to 2,500 B.t.u. developed capacity for the direct fired furnace. For the domestic furnace, the usual ratio of grate area to heating surface is about 1-to-20, while for the large commercial furnace this ratio may be as high as 1-to-40.

In order to obtain the required amount of heating or radiating surface, the surface of the furnace may be corrugated, or provided with convolutions, fins, or tubes.

The construction of the furnace proper may be of cast iron, cast in sections, with joints made up in furnace cement, or may be of welded or riveted steel construction. In the

vicinity of the fire, the steel furnace must be lined with fire brick or clay in order to prevent burning of the furnace.

The capacity to store heat of the mass of fire clay is of particular advantage to the steel furnace, especially when used with oil burning equipment, as the stored heat is given off during the off-cycle of the burner, with the result that more even temperatures are maintained.

Entirely enclosing the furnace proper is the casing. The casing usually is 22 to 26 gauge galvanized or enameled iron, and may be either plain or of ornamental design. The design of the casing must be such that the flow of air to be heated is properly directed and distributed about the hot radiating surfaces of the furnace, the flow being produced either by gravity or by a circulating fan.

The arrangement should be such that the air to be heated is introduced at the bottom of the casing and is circulated upward in contact with the radiating surfaces to the "bonnet," or hot air plenum chamber at the top of the furnace.

This arrangement must be used when circulation is to be by gravity, and is preferable even when a circulating fan is to be used as a certain amount of gravity circulation during off-cycles of the fan assists in maintaining more even room temperatures, and is necessary for operating the furnace-stat which is located in the bonnet when automatic control is used.

When a circulating fan is used, it should be located at the inlet to the furnace casing so that a pressure is maintained in the air chamber in order to prevent flue gas and poisonous carbon monoxide from being drawn into the air stream.

- AIR CONDITIONING ENGINEERING -

Factors Governing Design of Boilers And Furnaces

(Concluded from Page 18, Column 5)

Since the rate of combustion is higher for mechanical stokers than for hand firing, more combustion space per unit of grate area is required for the stoker. However, in general, 1 cu. ft. of combustion space is required for a developed capacity of from 35,000 to 50,000 B.t.u. per hour. In order to maintain good combustion, the gases within this chamber should not fall below 1,200° to 1,400° F.

The heat resulting from combustion is delivered to the heating surfaces primarily by radiation and by convection. Surfaces which are so located that they are in the direct "shine" of the fire are known as "direct" heating surfaces, and absorb heat by radiation from the fire itself, as well as by convection from contact with the hot gases. Such surface may be from 5 to 10 times as effective as "indirect" heating surfaces, or those which are not shone upon by the fire and so absorb heat by convection only.

Therefore, other things being equal, the most effective boiler per unit of weight will be the boiler which has the highest percentage of direct heating surface. In order to obtain this feature, it is necessary to surround the grate and the combustion chamber with direct heating surface, and to provide refractory baffles which will prevent the hot gases from falling below the combustion temperature before complete combustion can occur.

This fact complicates the problem, because such baffles tend to shade the heating surface from the direct effect of the fire. In some designs, the proportion of direct surface is

increased by providing lugs which project from indirect surfaces in such a way that they are in the direct shine.

Generally, the boiler with the lowest stack temperature for a given load will show the highest efficiency, since less heat is being thrown up the stack. This and other considerations generally limit the desirable rate of heat transfer for the well designed heating boiler to from 3,500 to 5,000 B.t.u. per hour per sq. ft. of average heating surface for the hand-fired boiler, to from 4,500 to 6,000 B.t.u. per hour per sq. ft. of average heating surface for the stoker or oil or gas-fired boiler, with normal operation around the lower figure, in each case.

Rapid circulation of the water to be heated or evaporated is obtained by providing continuous unobstructed passageways, so that the water is passed in a thin sheet over the heating surface, and by introducing the returns and make-up water at the coldest portion of the boiler and taking off the hot water or steam at the hottest portion.

Rapid circulation is desirable not only in the interest of high performance, but also to prevent overheating of, and injury to surfaces which are exposed to high temperatures.

The required amount of liberating surface (which is the horizontal surface of water at the water line) depends upon the maximum rate of combustion to which the boiler is to be submitted. One sq. ft. of liberating surface per 50,000 to 100,000 B.t.u. has proven satisfactory, the smaller figure being for the smaller boiler sizes.

The feature of durability, dependability, and freedom from service will be obtained as a matter of course if the boiler is properly designed as described above. In addition to the points mentioned, the following rules must be observed also.

1. Undue strains due to contraction and expansion must be avoided.
2. Both the wetted surfaces and the surfaces exposed to the fire must be arranged so that they may be cleaned.
3. Materials must be carefully selected, in view of the service for which they are to be used.
4. Workmanship must be of the best.
5. Gaskets must not be located so they will be subjected to high temperatures.

Broadly speaking, boilers are divided into two classifications—cast iron and steel.

The cast iron boiler is limited to low pressure heating service. Its chief advantages are that it is less liable to damage from rusting, and that since it is built up in sections it is more easily transported and may be passed through much smaller openings in the building construction.

Main advantages of the steel boiler are that much higher ratings may be obtained from it per square foot of heating surface, or per square foot of floor area occupied, or per pound of weight, and that it is easier to design for ease of cleaning.

Steel boilers are divided into "fire tube" and "water tube" boilers. In the fire-tube boiler, the hot gases pass through the tubes, while the water circulates outside the tubes. In the water-tube type, the water passes through the tubes, while the hot gases circulate outside the tubes.

The water-tube principle is espe-

cially adapted to large boilers, as rapid circulation of large quantities of water is more easily obtained with this type, and it adapts itself more readily to use in conjunction with large combustion chambers and gas volumes. Therefore, the water-type boiler is generally used for high-pressure duty, and is rarely used in heating work, except for very large systems.

Steel boilers may also be divided

50 TONS F12

ALCO

New "T" SERIES

HIGH CAPACITY

THERMO VALVES

95 TONS CH₃CL

CONCEIVED, Designed, and Perfected after many months of research in both laboratory and field.

Types "TIL" and "THL" for Freon and Methyl Chloride are now available. They are particularly desirable where extreme sensitivity is required—or where a distributing means or other restriction causes a pressure drop between the valve and the evaporator—or where there is a loss in pressure at the valve inlet due to pressure loss in the liquid line. They control from no load to full load with perfect modulation.

Small in size—light in weight—simple in design—ruggedly built to exacting precision limits, they can be incorporated as an integral part of the system without fear of refrigerant loss from the system through valve failure.

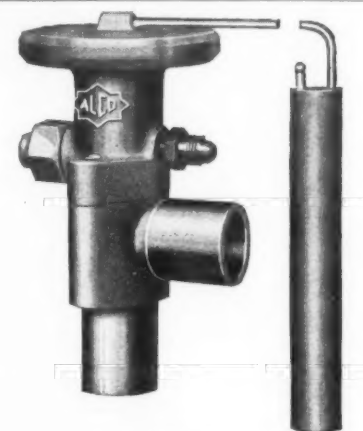
Furnished Only With External Equalizing Port.

For complete details ask for Bulletin 144B.



ALCO VALVE CO., Inc.

2628 Big Bend Boulevard
St. Louis, Missouri



TYPE TIL



TYPE THL

Maximum Tons of Refrigeration
With CH₃CL and F12

	F12		CH ₃ CL	
	TIL	THL	TIL	THL
*30 lb.	23	35	45	67
*40 lb.	27	40	52	77
*50 lb.	30	45	58	86
*60 lb.	33	50	64	95
*70 lb.	36	54	69	103
*80 lb.	39	58	73	110
*90 lb.	41	61	78	116

*Pressure Difference Between Valve Inlet and Outlet.

Valve	Dimensions	Weight
TIL	5-9/16" x 3-3/8"	3 lb.
THL	7" x 5-1/16"	3 1/4 lb.

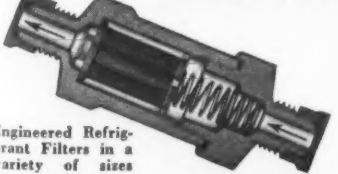
*Including Adapters.

THE NEW ZENITH REFRIGERANT FILTER

FOR SULPHUR DIOXIDE

FREON OR METHYL CHLORIDE

REFRIGERATORS



Engineered Refrigerant Filters in a variety of sizes for varying capacities.

Zenith Filters have already proved their value and efficiency in thousands of commercial installations. Now these specially built Filters are available for any size or type refrigerator using Sulphur Dioxide, Freon or Methyl Chloride. Better performance, greater economy, minimum service and better satisfied customers will result from their use in new or old models.

Special features include: Patented Element—Easily and Quickly Cleaned—Easy to Install—Insures positive protection from dirt in the refrigerant liquid—Corrosion-proof, leak-proof and ample capacity. Write for full details.

ZENITH CARBURETOR CO.

Subsidiary
BENDIX AVIATION CORP.
Detroit, Michigan

Danforth Distributes Bonus to Employees

PITTSBURGH—A cash bonus of from two to four weeks' extra salary was given 70 sales, service, and clerical employees of Danforth Co., distributor of Westinghouse products here by I. W. Danforth, president of the company.

Cleveland's New Electrical Code Up to Council

CLEVELAND—Cleveland's new electrical code is ready for action of the city council, having received the approval of the council's development committee.

The lengthy and detailed ordinance will increase electrical installation

costs materially in commercial, industrial, and professional plants and offices—largely because standards set in the present antiquated code are dangerously low.

Although based on the code of the National Underwriters Association, many provisions of the new ordinance are more stringent.

Thompson to Aid Kelvinator On Utility Service Problems

DETROIT—George Thompson has been appointed special assistant to E. A. Seibert, director of service for Kelvinator division, Nash-Kelvinator Corp., in a further effort to coordinate the activities of the service department with the specific requirements of public utilities.

The service department now consists of 30 men trained and experienced in the household field. They will be available to render assistance to operating companies throughout the country. This activity will assure public utility customers the greatest possible service from Kelvinator products, it is believed.

Kason Catalog Presents Line of Commercial Hardware

BROOKLYN — Kason Hardware Corp. is devoting a special section of its new catalog to presentation of a new line of freezer and cold storage door hardware, comprising high-offset latches, double-seal latches, and special hinges suited for heavy doors. The catalog will be available soon, according to Advertising Manager E. Klein.

COMMERCIAL REFRIGERATION SERVICE

Effect of Baffles on Circulation In Walk-in Coolers

CHAPTER 7—Evaporators & Refrigerant Controls (Cont.)

BY K. M. NEWCUM

Baffle Construction In Walk-in Coolers

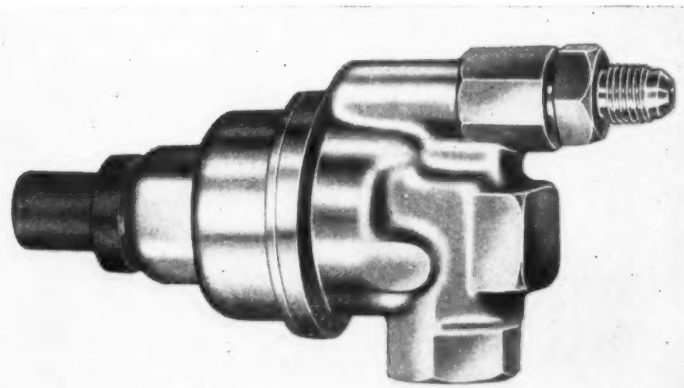
Fig. 121 shows the theoretical result of not using a warm air baffle or guide, while Fig. 122 indicates the proper circulation obtained by using the warm air guide or baffle arrangement.

The location of the baffle is important for it affects circulation. Note in Fig. 123 the warm air flue is wide while the cold air flue is narrow, thus restricting the cold air circulation. The reverse of this condition is given in Fig. 124 where the warm air flue is restricted and the cold air wide.

STANDARD REFRIGERATING APPLIANCES

New and Exclusive FEATURES

THAT ASSURE FINER PERFORMANCE ARE ENGINEERED INTO THESE—



TYPE "A" AUTOMATIC EXPANSION VALVES

Among the outstanding features of these valves are forged bodies—live rubber, easily removable breather caps—removable needles and seats. These valves are rugged, dependable, highly efficient and interchangeable with all refrigerants. The added features contribute greatly to a new standard of valve performance. Frankly, no finer valve has ever been offered to the industry, nor can they be out-performed in any comparable service.

Write for bulletins on the complete line of Blue Ribbon appliances

AMERICAN INJECTOR COMPANY
RILEY ENGINEERING CORP. Associate
1481-14TH ST. • Phone: LAFAYETTE 0350-0552 • DETROIT, MICH.

PROPER LOCATION

Frigidaire engineers who have had a great deal of experience with flooded evaporators in commercial refrigeration recommend locating and spacing the baffle as shown in Fig. 125 for coolers less than 10 ft. in width, and as shown in Fig. 126 for coolers over 10 ft. in width.

FACTORY SPECIFICATIONS

Considerable data now are available to all refrigerator manufacturers, and it may be assumed that the baffle or baffles furnished with a new cooler, made by a responsible manufacturer, will provide proper circulation without any alterations except in a few special cases. The refrigerator manufacturer will gladly cooperate with the installer or service man on any problems pertaining to baffle design, construction, and application.

Earlier installations of flooded coils in the coolers were more or less on a "cut and try" basis, with greatly varying opinions as to the location of the cooling coil in relation to the baffle as it effects circulation.

Fig. 127 may offer a few suggestions on the proper location advanced by Frigidaire engineers.

Location of Coils in Relation to Servicing

The location of cooler coils regarding accessibility for future servicing is an important item. Many service men have experienced the unpleasant task of changing a float valve in a flooded coil back in a tight spot where working is next to impossible. Arranging the coils so they may be serviced conveniently and rapidly when necessary is an important part of the installation man's job.

CONSTRUCTION OF COILS

Where two or more coils are installed in one cooler or case requiring the use of tees, valves, or other fittings, all lines should be run to the outside of the refrigerator and the fittings installed there.

Minimizing the number of joints in a refrigerator will minimize the number of possible leaks within the refrigerator with their consequential effect upon meats and other produce. Correcting leaky float valves, clogged strainers, etc., are considered normal service jobs on older flooded coils.

RESOLDERING EVAPORATORS

The original flooded coils were assembled using soft, half lead and half tin solder around the header and where the tubes join the header. Food acids within the refrigerator tend to decompose the lead in the solder causing the joints to give away and leak after several years of service.

This condition has resulted in many serious gas leaks at considerable expense to the merchants and in some cases to the distributor. As a result of the experience thus gained, silver solder was used in place of the half and half. Silver solder, estimated to cost about 14 times as much as half and half, proved completely satisfactory for this purpose.

It is considered good practice to resolder the old evaporators, using silver solder—providing of course that the cost is considerably lower than a new more modern replacement evaporator.

Service men are cautioned against using half lead and half tin solder on any soldered joint within a refrigerator. Where the use of silver solder is not practicable, 95% tin and 5% antimony solder is recommended, having proved its definite resistance to food and product acids.

No Warm Air Baffle

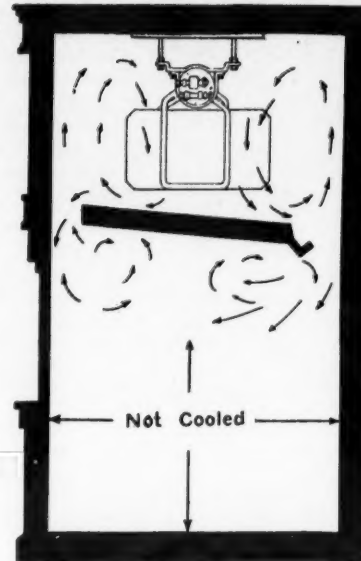


Fig. 121—Circulation where no warm air baffle or guide is provided.

With Warm Air Baffle

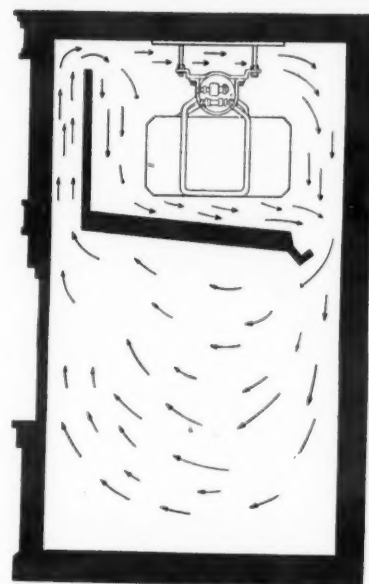


Fig. 122—Proper circulation obtained with warm air baffle.

Narrow Cold Air Flue

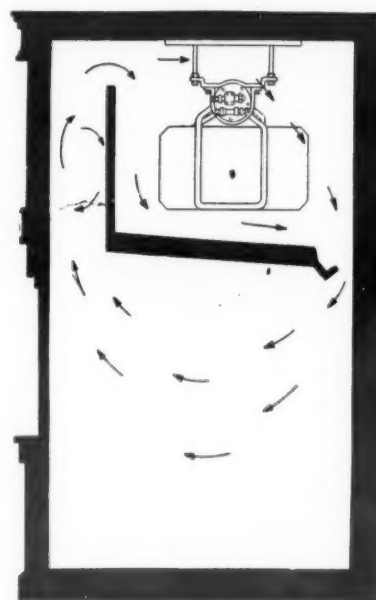


Fig. 123—Restriction of cold-air circulation by narrow flue.

Narrow Warm Air Flue

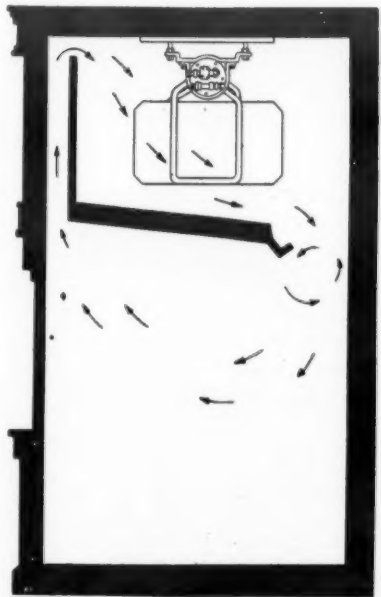


Fig. 124—Restriction of warm air flow by narrow flue.

Summary of Commercial Manual Subjects in Chapters 6 and 7

Chapter 6, Commercial Condensing Units—Body and Housing Assemblies, Sept. 2; Crankshaft, Eccentric, and Connecting Rod Assemblies, Sept. 9; Piston and Piston Valve Assemblies, Sept. 16; Discharge Valve Assemblies, Sept. 23; Suction Valves and Stuffing Box Seals, Sept. 30; Compressor Shaft Seals, Oct. 21; Compressor Shut-off Service Valves, Nov. 4; Air-Cooled Condensers, Nov. 11; Liquid Receivers, Nov. 18; Double-Tube Condensers and Water-Cooled Condenser-Receiver, Nov. 25; Water-Regulating Valves, Dec. 2, 9, and 16.

Chapter 7, Evaporators and Refrigerant Control Valves—Low-Side Float Valves and Evaporators, Dec. 23; Float Valve Calibration, Dec. 30; Types of Flooded Evaporators, Jan. 6; End Bunker Display Case Installations, Jan. 13; Types of Display Case Coils, Jan. 20; Reach-in and Walk-in Cooler Installations, Jan. 27.

Proper Spacing

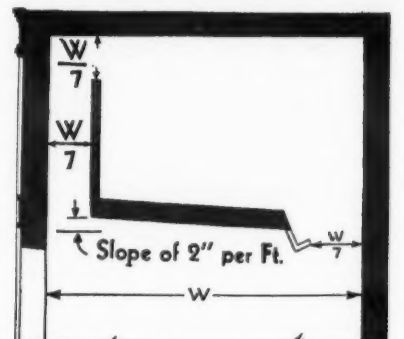


Fig. 125—Proper spacing of baffle for coolers less than 10 ft. in width. W=width.

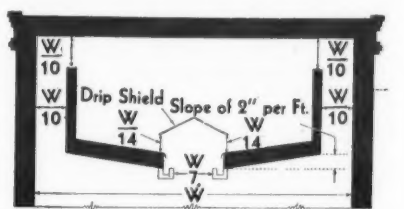
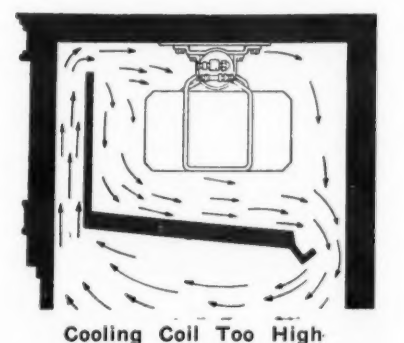
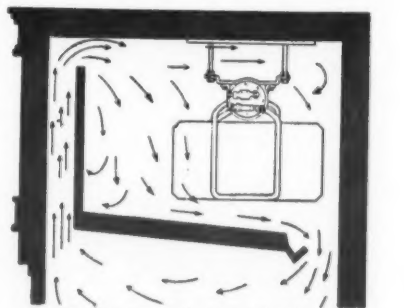


Fig. 126—Proper spacing of baffle for coolers 10 ft. or wider.

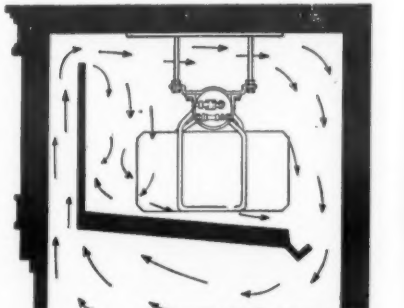
Location of Coils



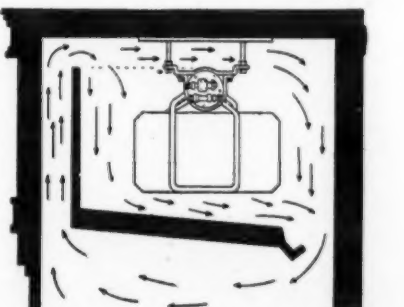
Cooling Coil Too High



Cooling Coil Off Center



Cooling Coil Too Low



Cooling Coil Properly Placed

Fig. 127—Suggestions on coil location by Frigidaire engineers.

Carbondale Introduces Unit Conditioners

(Concluded from Page 1, Column 3)
from the exterior, so that lubrication and other service operations are greatly facilitated. The fans may be reached merely through the removal of one panel. Even the coils may be removed without dismantling.

Complete, year-round air-conditioning service is available through the use of these units, as each contains the necessary elements for cooling, dehumidifying, heating, humidifying, air cleaning, and circulation. However, the heating and humidifying elements may be omitted if desired.

Construction is of heavy steel panels and frames welded and coated inside with water-proof and sweat-proof insulation. The outside surfaces are finished in rust-resisting enamel.

All sizes are available in the vertical floor-mounted type and in the horizontal ceiling-suspended type, and each unit is available in a range of air and coil capacities to suit many load characteristics. These features make it possible to fit the equipment to any type of installation as if the unit were "tailor-made" for the job.

Air delivery capacities are available over a range from 300 c.f.m. to 11,000 c.f.m., while refrigeration capacities range from 2 to 50 tons.

The refrigerating units for use with the above air-conditioning units are the typical Carbondale self-contained 4-cylinder V-type units complete with compressor and condenser.

Available for use with the refrigerating units are the Carbondale "Shower Condenser" units, which consist of condenser, receiver, and modified cooling tower all in one assembly.

A high temperature is built up in this area due to the show window lighting end for which no means of ventilation is provided. For larger applications it would be well to consider some means of heat removal from the show window space.

The heating load may be easily calculated by figuring the capacity of the two radiators which have been serving the heating requirements adequately and which will be removed when this new equipment is installed. To this figure we should add the additional requirement to heat the larger quantity of fresh air desired.

In other words, add approximately 16,480 B.t.u. (200 c.f.m. x 1.03 x 80°) to arrive at the total heating requirement. We can check the total by an actual detailed heat loss computation for the store.

In studying performance data for various conditioners we can select a unit which will give slightly more than the desired cooling load when connected to a 5-hp. refrigeration compressor. This unit has an air capacity of 2,400 c.f.m. and is equipped with filters and heating coil as well as a cooling coil.

If we check the air capacity of this unit with the volume of the room, we arrive at a figure of 12 air changes per hour which is ample for comfortable conditions.

The unit can be installed as shown in Fig. 1 and some duct work will be necessary to connect the unit with the recirculating grilles and the fresh air intake. Either an automatic or manual damper should be installed in the fresh air inlet.

If the damper is thermostatically controlled, it may open wide when the outside temperature is between 70 and 80° and thus maintain a comfortable temperature in the sales space.

Other control arrangements may be utilized, but in any case it is advisable to keep the fresh air quan-

tity to the minimum compatible with comfort when the outside temperature is extremely hot or cold.

In selecting the supply grille we must give serious consideration to the proper air distribution, keeping in mind the physical details of the space.

It might be advisable to split the grille so that the upper portion will

discharge air at a high velocity for the front part of the store and the lower section provide air for the area toward the rear at a lower velocity.

The arrangement of the equipment shown is not the only way in which this air-conditioning application may be made, but is typical of one of the methods of handling this kind of a problem.

Installation Plan for a Shoe Store

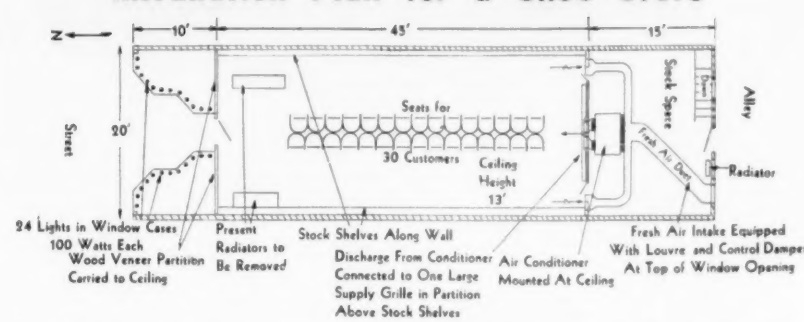


Fig. 1 shows the plan for a commercial installation such as a shoe store or similar retail establishment.

Heat Gain Calculations

Sensible Heat Gains:	
Partitions:	
Side (4-inch Tile)—1,170 sq. ft. x .27 x 12°	3,891 B.t.u.
Rear (Double-Plaster)—260 sq. ft. x .39 x 12°	1,217 B.t.u.
Front (Wood Veneer)—230 sq. ft. x .80 x 35°	6,440 B.t.u.
Door and transom (1/2 glass)—30 sq. ft. x 1.00 x 15°	450 B.t.u.
Ceiling (6-inch bare concrete)—900 sq. ft. x .59 x 12°	6,372 B.t.u.
Floor (6-inch bare concrete)—900 sq. ft. x .59 x 10°	5,310 B.t.u.
Lights—1,800 watts x 3.4 B.t.u. per watt	6,320 B.t.u.
Occupancy—30 people x 220 B.t.u. per person	6,600 B.t.u.
Fresh air—450 c.f.m. x 1.03 x 15°	6,950 B.t.u.
Total Sensible Heat Gains	43,550 B.t.u.
Latent Heat Gains:	
Occupancy—30 people x 180 B.t.u. per person	5,400 B.t.u.
Fresh Air—450 c.f.m. x .64 x (99-76) grains	6,624 B.t.u.
Total Latent Heat Gains	12,024 B.t.u.
Total Heat Gains	55,574 B.t.u.
Sensible heat plus latent heat	55,574 B.t.u.
Plus 5% safety factor	278 B.t.u.
Total Heat Gains with Safety Factor	55,852 B.t.u.
Ratio of Sensible Heat to Total Heat = .79	

HOW TO SELECT AND INSTALL AIR-CONDITIONING SYSTEMS

By T. H. Mabley, Chief Engineer
Mechanical Heat & Cold, Inc., Detroit

Case No. 4

Typical Commercial Applications

WHILE we are still discussing the application of units for various air-conditioning installations let us consider the installation of this type of equipment in a commercial establishment—in particular, a shoe store as shown in Fig. 1.

While a particular type of store was chosen, almost the same problems are involved with the selection of equipment of any other small mercantile establishment such as a small dress shop, hat shop, a jewelry store, a drug store, or the like.

Our first step is an analysis of the air-conditioning requirements. Temperature control is essential for both winter and summer.

The two radiators now located on either side of the front door take up valuable space and are unsightly in appearance. The owner is interested in eliminating these if the additional cost of the heating feature in the air conditioner is not too great.

Summer cooling is the prime reason for consideration of air-conditioning equipment. Ventilation and air circulation is the next most important reason for installing such a system in this store.

FILTERED AIR DESIRABLE

As for filtering the air, it may be readily concluded that some means of cleaning the air introduced into the space is essential, as every storekeeper wants to keep his stock and furnishings as clean as possible. In this connection it probably will be advisable to filter all air handled through the unit.

In thinking of humidity control we are concerned primarily with dehumidification in summer, as winter humidification is still quite a luxury for a commercial establishment, and furthermore the problem of moisture formation on the show windows might seriously handicap any efforts to raise the humidity content to any considerable degree.

VENTILATION FOR COOLING

The ventilation requirements are not so very great from the standpoint of freshening the air, but it is desirable to provide adequate facilities to give some cooling by ventilation on mild days when normally the inside temperature would be higher than the comfort point.

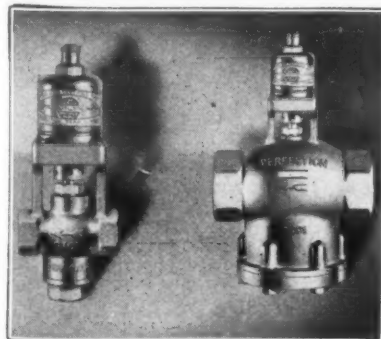
If a large quantity of outside air were introduced into this space the temperature could be lowered. Furthermore, the stagnation and stratification of air usually observed in a well protected store such as this one can be reduced by recirculation and introduction of fresh air.

The normal infiltration may be something between 1 and 1½ air changes. This amounts to approximately 200 to 300 c.f.m. With an occupancy of 30 people we are slightly under the minimum desired quantity of fresh air for each occupant. A figure between 400 and 500 c.f.m. would be more preferable and so we will use our equipment to introduce this minimum quantity of air into the store.

As a result of this arrangement we will have a slight exfiltration from the conditioned area, a feature which is somewhat desirable for this type of application.

The next step in our procedure is to calculate the heat loads. Table 1 gives our detailed calculations:

It may be observed that an arbitrary figure of 35° temperature difference was taken for the front partition which of course is based only on an estimated average temperature in the showcase and the space above.



PERFECTION Condensing Water Regulators are Certified to Excel

Ask for catalog covering complete line of Condensing Water Regulators, Compressor Parts, Valves, and Fittings

PERFECTION REFRIGERATION PARTS CO. HARVEY, ILLINOIS

Artic (DU PONT METHYL CHLORIDE)

COAST-TO-COAST DISTRIBUTION—The standard Methyl Chloride. Stocked in standard and special 20-lb. containers for prompt delivery at 65 stock points in 46 cities; also Cuba, Mexico and Hawaiian Islands.



THE R. & H. CHEMICALS DEPARTMENT
E. I. DU PONT DE NEMOURS & CO., INC.
WILMINGTON • DELAWARE



AT YOUR FINGER TIPS

Write for free copies of "ARTIC Service News" containing list of authorized distributors and stocking points, and current information about refrigeration.

What, why and how much AIR CONDITIONING CONTROL



Here are three new guides to help you in the planning and selection of control equipment for Heating, Cooling, Humidification and Dehumidification. These bulletins have been written to show clearly the functions and operation of control equipment for all of the customary types of domestic and commercial air conditioning systems—not to sell any one type of system or control.

They deal with the principles involved and the results to be accomplished. They show how to plan a given job economically and to avoid subsequent trouble and servicing. They are offered primarily for the purpose of promoting air conditioning at large.

The coupon will bring your copies to you promptly until the supply is exhausted.

DETROIT LUBRICATOR COMPANY

5900 TRUMBULL AVENUE • DETROIT, MICHIGAN

NEW YORK, N.Y.—40 West 40th St. • CHICAGO, ILL.—816 South Michigan Ave.



Canadian Representative—Railway and Engineering Specialties Ltd., Montreal, Toronto, Winnipeg

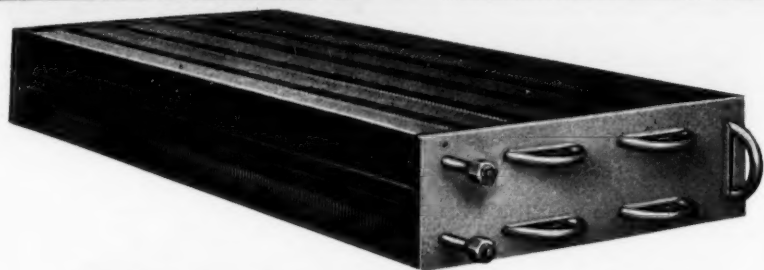
DETROIT LUBRICATOR COMPANY Dept. 8
5900 TRUMBULL AVENUE, DETROIT, MICHIGAN

Please forward Bulletins 83, 84 and 90, dealing with air conditioning control.

NAME _____
COMPANY _____
ADDRESS _____ POSITION _____

— BUYER'S GUIDE —

SUPPLIERS WHO SPECIALIZE IN SERVICE TO THE INDUSTRY



Peerless Fin Coils

30%

More Efficient

PEERLESS "RIFLED" FIN COILS -- are available in over 150,000 shapes, sizes and combinations—in other words, they are the perfect solution to any refrigeration problem. Shipment—24 hours from receipt of order from 3 factories.

PEERLESS of AMERICA, Inc.
ESTABLISHED IN 1912 AS THE PEERLESS ICE MACHINE CO.

NEW YORK

43-20 34th St. LONG ISLAND CITY

Three Factories

CHICAGO

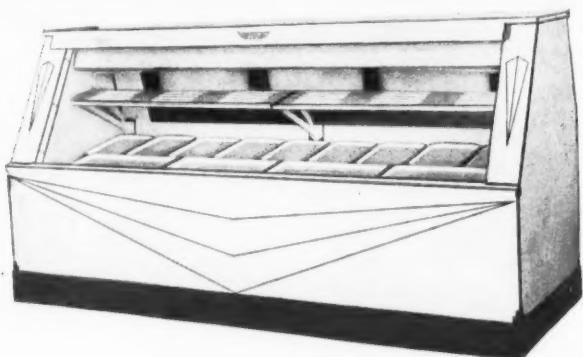
515 West 35th St.

LOS ANGELES

3000 South Main St.

Square foot for square foot, Peerless "Rifled" Fin Coils are thirty percent more efficient than the average coil on the market today. This is not an empty claim—but has been proven time and again by repeated tests in both laboratory and field. Peerless "Rifling" throws the refrigerant against the entire tubing wall—greatly increasing heat transfer. One inch spaces between finned courses makes for better air circulation through the coil. "Wedge-Locking" gives absolute metal to metal contact between fins and tubing. Only Peerless offers these superior features. Only Peerless coils are 30% more efficient.

Guaranteed Satisfaction to Seller and User Assured You by Fogel Cases and Coolers. The Stamp of Approval by Fogel Insures You of Quality Throughout by Concentration on a Quality Line Only. The Sale of the Fogel Quality Line Will Earn Larger Profits for You Through Increased Volume.

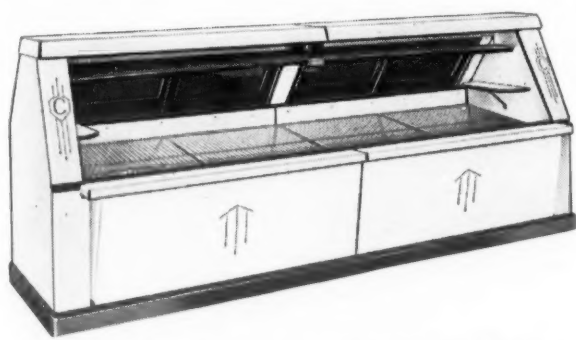


Write for details today. Our Franchise is valuable.

- 1—Immediate acceptance through exclusive selling features.
- 2—Greater value, quicker results, larger profits.

FOGEL REFRIGERATOR COMPANY
Philadelphia, Pa.

The Campbell line will earn you a **PROFIT!!** WHAT'S MORE it will be net profit. You won't spend it in service after the job is installed.

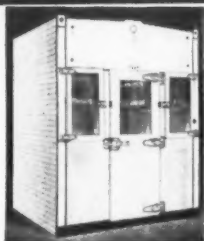


If you are interested in an exclusive, profitable dealer's franchise, write,

CAMPBELL REFRIGERATOR CO.

748 W. Virginia Street
MILWAUKEE, WISCONSIN

DISTRIBUTORS WANTED



Percival equipment meets every requirement of the modern food store.

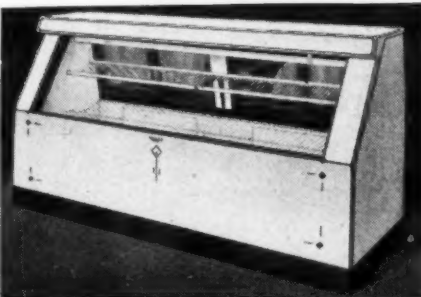
For mechanical refrigeration only

Percival's complete line will increase your sales of electrical refrigeration equipment and offer added earnings. Desirable territories still available. Write for complete information.

1886-1937

51 years of service to meat markets.

C.L. PERCIVAL CO.
DES MOINES, IOWA



Clary-Marsh Dealership Opens In Birmingham

BIRMINGHAM, Ala.—The new firm of Clary-Marsh, Inc., wholesale distributor for Universal ranges, washers, refrigerators, and other electrical appliances, opened for business Jan. 1 at 22 South 20th St. here. Territory served will be Alabama and West Florida.

Members of the firm are James W. Clary, until recently manager of the electrical appliance division of the Perfection Mattress & Spring Co., Birmingham; and Hal Marsh, for several years associated with the Acme Co.

St. Louis Dealer Moves To New Trade Area

ST. LOUIS—Electrolux Refrigerator and Appliance Co. of St. Louis will move into new and larger quarters at 3552-54 Gravois Ave., a prominent location at the Grand-Gravois intersection offering greater opportunity for window display.

The company retails Electrolux, Servel, Crosley, Leonard, General Electric, and Hotpoint refrigerators.

Larger Staff & Warehouse Planned for Tulsa Wesco

TULSA, Okla.—The Tulsa office of Westinghouse Electric Supply Co. will undertake an expansion program this month which will increase the personnel by four, and warehouse space by 20%, according to W. A. Brent, Tulsa manager.

G. H. Miller, district manager, and John H. Boss, Jr., district merchandise manager of the supply company, and Gene Reid, merchandise supervisor for Westinghouse Electric & Mfg. Co., all of St. Louis, were in Tulsa late in January to discuss the program.

Lawrence Joins Wesco Branch In Baltimore

BALTIMORE — Emory Lawrence, former manager of department store refrigeration activities for Parks & Hull Appliance Corp., has become associated with the refrigeration division of Westinghouse Electric Supply Corp. In his new capacity, Mr. Lawrence will assist S. Gordon T. Parks, former head of Parks & Hull, now manager of the refrigeration division of the local Westinghouse branch.

— AIR CONDITIONING ENGINEERING —

Reactions of Human Body to Air Conditions Described by Mayo Doctors

BY F. O. JORDAN

ST. LOUIS—"Investigation on the Exchanges of Energy Between the Body and Its Environment," the paper given at the A.S.H.V.E. convention here last week by Drs. Charles Sheard and M. D. Williams, director, and associate, respectively, of the Division of Physics and Biophysical Research, the Mayo Clinic, is of interest to the air-conditioning engineer because it explains the reactions of the human body to the conditions of the air surrounding it, and because it describes the methods by means of which the human body attempts to maintain its temperature balance.

Ostensibly, the chief aim of the air-conditioning engineer is the maintenance of comfort for the human body insofar as the comfort of the human body depends upon the condition of the atmosphere with which it is surrounded. Thus it behooves the engineer to learn everything within his power concerning the reactions of the human body to the air which surrounds it, for only with the help of this knowledge can he accomplish his purpose in the most efficient and effective way.

It seems most reasonable to assume the medical profession to be best fitted to ascertain the reactions and functions of the human body, for knowledge of the functions and reactions of the human body is the doctor's business.

By the same token it is logical to delegate the engineering profession to apply the laws of Nature toward assisting the functions of the human body as discovered by the doctor, for the application of the laws of Nature is the business of the engineer.

Reduced to engineering language, this paper which was prepared by doctors tells us that the human body is a heat reservoir, a reservoir in which Mother Nature has decreed that a constant temperature must be maintained during the life of the reservoir.

To this reservoir, heat is added constantly in the form of the food to which it is addicted. Therefore, in order to prevent a rise in temperature, it is necessary for heat to be removed from the reservoir at a rate commensurate with the rate at which it is added. This heat is removed principally by respiration and by radiation, conduction and convection from the surface of the body.

If it were true that the rate of food consumption remained continuous and constant, and that the body remained always exposed to air at the same condition, the problem would be simple.

But unfortunately, the ingestion of food takes place only at intervals, so that the rate of heat input is a variable. Furthermore, the condition of the air surrounding the body surface is far from constant, so that the rate of heat output is a variable also, because the temperature differential between the bodily surface and the surrounding air is a variable. And, to make matters worse, these two variables are independent of one another.

How then can the heat which is stored within the reservoir be maintained at a constant level? No cause for alarm of course, for Mother Na-

ture has been taking care of the matter for a long time.

Her method is merely to provide suitable radiators from which the circulation of heat may be turned off, or to which it may be turned at will. After a big feed, during which much heat has been poured into the reservoir, the radiators are turned on so that surplus heat is allowed to flow into the radiator to be radiated into the surrounding atmosphere, thus preventing an undue rise in the temperature of the body.

In case the temperature of the surrounding air falls so low so that the temperature of the reservoir is in danger of falling too low because of depletion of its store of heat, the heat is shut off from the radiators so that they cool down to so low a temperature that they radiate little or no heat, with the result that the rate of heat removal from the reservoir is curtailed.

How simple and effective. But what are these radiator?

Merely our hands and feet, which we have been using for incidental purposes all these years, unmindful of their real purpose.

While the fact that the body temperature rises slightly and the temperature of the extremities rises considerably for a considerable period after meals is interesting, it may be of no particular use to the air-conditioning engineer. However, it may be worthy of consideration when select-

ing design conditions for the conditioned space to ascertain whether the space is to be occupied by persons who have just eaten, or by the people who have not broken the fast for some time.

Obviously, the fact that the hands and feet become quite cool when the temperature of the conditioned space is too cool indicates that inside design temperatures should be kept in the upper range of the "comfort zone," in the interests of health and comfort.

Even the point about hand and foot temperatures falling off at low relative humidities may explain some of the current objections about air conditioning, and certainly indicates that humidities can be carried too low for health and comfort.

So much for the simple language of the engineer. The story as told by the doctor for the consumption of the engineer is contained in the following excerpts taken from the paper as it was presented.

DOCTORS' STORY

"The constant internal temperature of the body is the result of the balance between the production of heat in the body and the loss of heat from the body. This constancy (Concluded on Page 23, Column 1)

Time-Temperature Chart

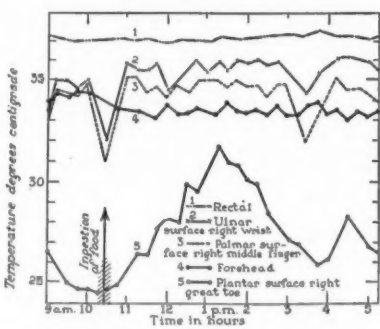


Fig. 1—Time-temperature relationships of areas of a normal male in basal condition and after ingestion of food. Environment temperature 77° F. and 40% relative humidity

Changes with Temperature Variations

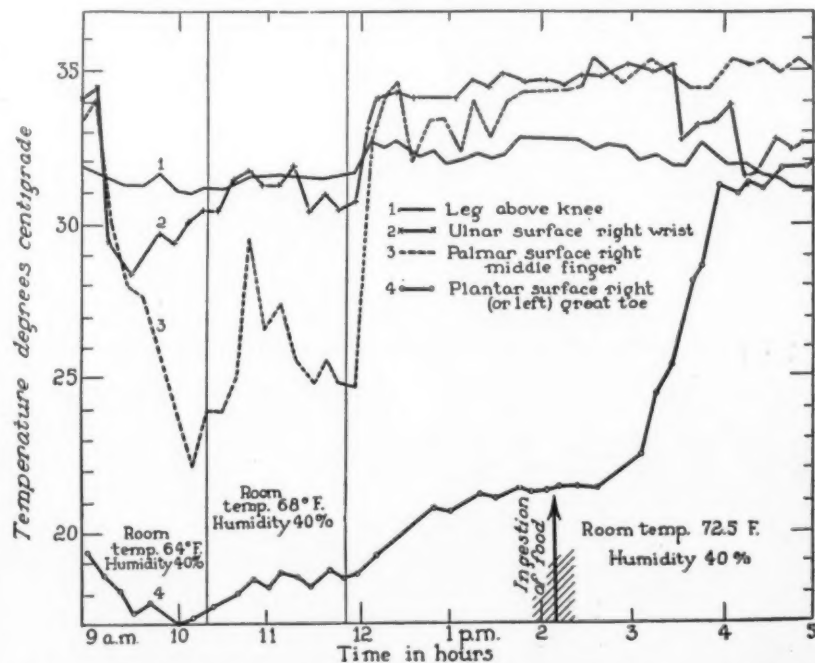


Fig. 2—Changes in superficial temperatures of areas of a normal male in the basal state produced by changes in environmental temperatures, humidity constant at 40%.

How Human Body Maintains Heat Balance Described in Report

(Continued from Page 22, Column 5) of internal temperature is maintained in the face of rather wide variations in the production of heat and in the environmental conditions.

"It has been shown by various investigators that approximately 75% of the total elimination of heat from the body is by radiation, conduction and convection from the skin and about 25% by the vaporization of water from the skin and lungs when activities, short of physical labor, are carried on under comfortable environmental conditions.

"The necessity of the additional clothing in cold weather, on the one hand, in order to prevent an excess loss of heat from the body and, on the other hand, the inadequacy of the processes of radiation, convection and conduction to produce sufficient dissipation of heat in hot weather without increased vaporization of water from the skin are so well known that a passing mention of them is sufficient.

"The temperature of the skin in any small area is the resultant of the heat brought to it largely by the blood and of the heat lost by the various dissipative processes which have been mentioned. Hence the amount of heat to be lost, in order to maintain constancy of the internal temperature of the body, and the temperature and humidity of the environment into which this energy has to be dissipated are the two chief factors which control the temperatures of various parts of the surface of the body. Recent investigations have indicated that, under increased environmental temperatures or with an increased production of heat, there is a change in the amount of blood, under the control of the mechanisms regulating temperature, which is brought to various portions of the surface of body.

"Apparently, within the comfortable ranges of temperatures and humidities, this accuracy of regulation, in order that the production of heat may equal the loss of heat, is ac-

complished largely by the peripheral vascular systems of extremities.

"This presentation gives the results of investigations concerning the changes in temperature of the skin in various regions of the body produced under varied but controlled environmental conditions, direct evidence concerning the portions of the surface of the body which are chiefly concerned with the exchanges of energy between the body and its environment, as well as furnishing indirect evidence concerning the increase or decrease of supply of blood to various peripheral regions.

"In these investigations three psychrometric rooms were used, equipped with apparatus capable of maintaining the environmental temperatures within $\pm 1^\circ$ F. and the humidity within $\pm 3\%$. In general, these rooms have been maintained at 65 to 68° F., 76 to 78° F., and 90 to 92° F. respectively with a relative humidity of 40% in order to investigate the effects produced by sudden changes in environmental temperature (accomplished by moving the bed and subject from one room to another) on the skin temperatures of various regions of the body in a basal metabolic condition as well as subsequent to the ingestion of food, exercise or change of posture of the body or of the extremities only.

"Environments which are relatively warm (90° F.) and cool (60° F.) respectively enable these and other types of data to be obtained in cases of persons who complain of symptoms and reactions produced by heat and cold.

"The subjects wore very light pajamas, so arranged that the arms and legs were exposed, and remained in a horizontal position on a comfortable bed during the period from 9 a.m. to 5 p.m. The head was raised slightly and a stand was arranged to carry reading material in order to minimize restlessness and to insure the arms remaining as much as possible in horizontal position.

"The temperatures of the plantar surfaces of the right and left great toes, the volar sides of the distal phalanges of the right and left middle fingers, upper legs, ulnar wrists and forehead were measured by means of copper-constantan thermocouples. A thermocouple was used for checking the rectal temperature.

SKIN TEMPERATURES AND THE BASAL METABOLIC STATE

"When the expression basal metabolic state is used, certain conditions are requisite namely, fasting, normal body temperature, muscular relaxation and comfortable environment. The fasting, resting nude subject is an environmental temperature of about 75 to 77° F. with a relative humidity of 20 to 40% produces heat at the basal rate.

"Since the internal temperature of the body remains constant it follows that the removal of heat from the body must be at the rate at which it is produced. It is necessary, therefore, to obtain data concerning the values of the skin temperatures in various areas of the body in the basal state in order properly to evaluate the role which the various portions of the surface of the body play in the dissipation of heat so that the temperature of the body, as evidenced by rectal readings, may be kept constant.

"These tests definitely point to the necessity for obtaining the various skin temperatures over a considerable period of time while the subject is in the basal state, before proceeding to measurements of the effects produced by changes in environmental conditions, the ingestion of food, exercise, posture and the like or, again in clinical investigations of individuals having vascular diseases.

THERMAL CHANGES INDUCED BY THE INGESTION OF FOOD

"The necessity of basal metabolic conditions is emphasized when investigations are to be made on the so-called specific dynamic action of foods, or in the determination of the thermal changes produced in various areas of the skin of the body subsequent to the ingestion of food.

"After a fast of from 12 to 18 hours and after the temperatures in each area have remained constant to within approximately 1° C., the subject ate a meal which was balanced in essential types of food and sufficient to satisfy the hunger. In all

instances, the temperature of the forehead remained constant within 1 to 1.5° C. throughout the day.

"In general, shortly after the ingestion of food, the temperatures of the fingers, wrist, and upper leg rise to their maximal values. The temperatures of the toes and of the lower extremities rise, in a room temperature of 25° C. and 40 per cent humidity, in a manner represented in curve 5 of Fig. 1.

"In general it may be stated that the temperature of the fingers and lower portions of the arms rise to their maximal values before the regulation of the elimination of heat is taken up by the lower extremities. These changes varied in their periods of duration, but, in general, decreased to normal values within an hour or two.

"There are minor changes in rectal temperature following ingestion of food. The changes in surface temperatures of the body, particularly in the extremities, subsequent to the ingestion of food are indicative of increase in blood flow or increased rate of circulation.

EFFECTS ON SKIN TEMPERATURE OF CHANGES OF ENVIRONMENTAL TEMPERATURE

"After obtaining the findings on the changes in superficial temperatures produced in a group of normal individuals in the basal state and after the ingestion of food, investigations were made concerning the effects of changes of environmental temperature, the humidity remaining at 40%, on the sites and manner of control of the loss of heat or its prevention as the case might be. Fairly characteristic results are diagrammed in Fig. 2.

"The records of the measurements of skin temperature given in Fig. 2 clearly show the role played by the extremities, particularly marked in the fingers and toes, in the regulation of the loss of heat from the body, in the basal state, in order that the internal temperature of the body may be maintained quite constant at 98.6° F.

"The subject entered the room at 64° F. from an environmental temperature of approximately 78° F. At the end of an hour's time the temperature of the toes reached the temperature of the room. The marked regulation of loss of heat was accomplished by the fingers and lower portions of the arms, the temperatures of the fingers dropping from 34 to 22° C.

"The course of the changes of temperature of the wrist is similar to that of the fingers but not as great in range. On rapidly changing the room temperature to 68° F. the temperatures of the toes rose 1.5° C. but were slightly below the room temperature at the end of 1.5 hours. There was a sudden rise in the temperatures of the fingers, followed by a lowering of the temperatures to a steady state approximating 25° C. The temperature of the wrist was fairly steady.

"When the environmental temperature was raised to 72.5° F. the temperatures of the fingers rose rapidly and were maintained in the range of 32 to 34° C., the wrist being at a temperature of 34 to 35° C. The temperatures of the toes rose in about an hour to a constantly maintained value of about 21.5° C.

"These results show that the toes assume the room temperature throughout the range of environmental temperatures (64 to 72.5° F.), and that the loss of heat from the body is largely regulated by the hands and lower portions of the arms. On repeated occasions this subject, in the basal state, showed temperatures of the great toes ranging from 31

(Concluded on Page 27, Column 1)

BUYER'S GUIDE

SPECIAL RATES APPLY TO THESE COLUMNS ONLY
WRITE ADVERTISING DEPT. FOR FULL INFORMATION

LEADING MAKERS OF REFRIGERATING AND
AIR CONDITIONING EQUIPMENT STANDARDIZE ON

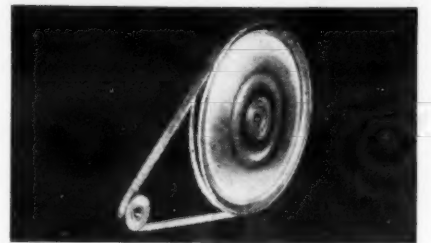
Dayton

V-BELTS

● Because of their outstanding advantages Dayton V-Belts have been used as original equipment on leading makes of air conditioning equipment, electric refrigerators, washing machines and other appliances for many years.

Dayton V-Belts are the logical choice because they provide silent, dependable transmission—because their powerful grip prevents slippage—because they run smoothly without weaving, twisting or vibrating.

A nearby distributor carries a complete stock of Dayton V-Belts at all



Whether for Fractional or a Thousand H.P. there is a Dayton V-Belt Drive for the job.

times and can quickly supply you. Write us for price list and complete information.

THE DAYTON RUBBER MANUFACTURING CO. • DAYTON, OHIO

World's Largest Manufacturer of V-Belts

The KOCH ECON-O-CASE

The Newest KOCH PRODUCT

CORKBOARD INSULATION
ALL-STEEL CONSTRUCTION

Built for SERVICE **Priced to SELL**

TRIPLE GLAZING-RUBBER DOORS
DOUBLE DUTY - 6, 8 and 10 ft. LONG

In addition to standard products, Koch now offers the Econ-O-Case, selling at the very lowest price level, and worthy of the Koch name in every respect. This new display case, sold only through distributors, opens a vast new market for Koch equipment. Write for details.

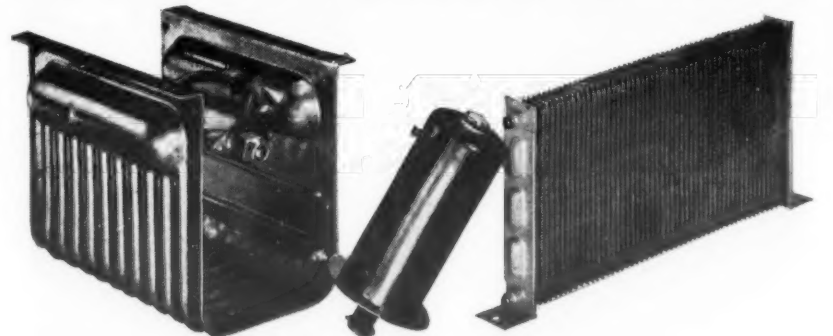
KOCH REFRIGERATORS

North Kansas City, Missouri

Economical IN COST
Economical IN OPERATION

WRITE TODAY FOR PROPOSITION

SUPPLYING THE REFRIGERATION INDUSTRY



Evaporators, Receivers, Condensers, Compressor Domes, Compressors and Mechanical Parts. Also "Houdize," a perfected process for permanently uniting ferrous or non-ferrous metals.

OAKES PRODUCTS CORP.
North Chicago and Decatur, Ill.

HOUE ENGINEERING CORP.
Buffalo, New York

DIVISIONS OF HOUDAILLIE - IHERSHEY CORPORATION
General Executive Offices: Detroit, Mich.



REFRIGERATOR FOOD DISPLAY

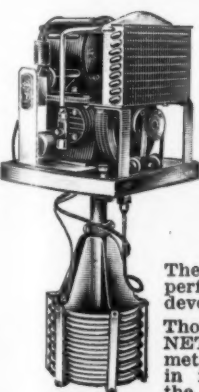
Durable composition Fruits, Vegetables, Meats, Fowl, etc. Natural colors, very realistic. 50 pieces in our line.
(Write For Price List)
Roman Art Co., Inc.
2700-6 Locust Blvd.
St. Louis, Mo.

TRAINED MEN NEEDED FOR AIR CONDITIONING

Institute Offers Home Study Training

Kansas City, February 2—Big business predicts tremendous increase this year in the wide spread installation of air conditioning equipment in homes, apartments, stores and public buildings of all kinds as presaged by the phenomenal activity during 1936. There is already a shortage of trained men, experts in all phases of air conditioning, in this fast growing industry. To forestall this shortage, according to Mr. J. J. Strang, a complete, scientific home study course, covering all phases of air conditioning—fundamental principles, selling, installations, servicing, inventions—has now been made available whereby many serious minded men can become expert in this field in six to twelve months. Air conditioning offers a new opportunity for ambitious men. Countless numbers of them will seize this opportunity to launch into America's next giant industry. For complete information write to J. J. Strang, Air Conditioning Institute of America, Department G-2, Fairfax Building, Kansas City, Missouri.

NETCO MILK COOLER COOLS MILK TO 50° IN 1 HOUR ECONOMICAL-DEPENDABLE



Low Cost Operation. No Installation Cost. Requires Less Service. Exclusive Mechanical Agitation. LOW INITIAL COST. Operates in any cooling Tank. Suitable for 4-8 can Size Tanks. Furnished with or without Cabinet.

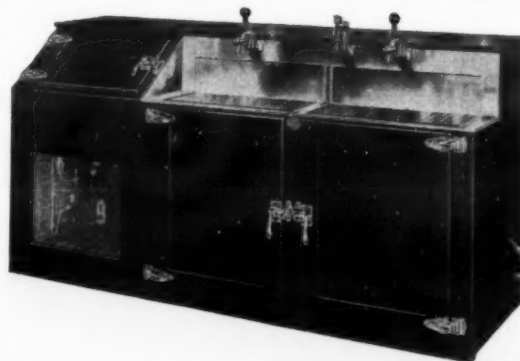
The most mechanically perfect Milk Cooler ever developed.

Thousands satisfied Users. NETCO Milk Coolers have met the test of time; now in its fifth year serving the Dairy Farmer. Send for free Folder. See your nearest NETCO Dealer.

Dealers Wanted

Exclusive Arrangement for good Territory open for Live Dealers. Write for Proposition.

National Electric Tool Co.
Dept. R. N., Chicago, Ill.



BIG SALES OPPORTUNITY

SUPER-COLD ELECTRIC HI-PRESSURE BEER DISPENSER

Saves 20-10 oz. Glasses on Every Half Barrel

Complete with compressor and air pump

100,000 RED HOT PROSPECTS
LOW LIST PRICES HEAVY DISCOUNTS

For Franchise write

THE SUPER-COLD CORPORATION,

1020 East 99th Street
LOS ANGELES, CALIFORNIA

Branches and Stocks at:

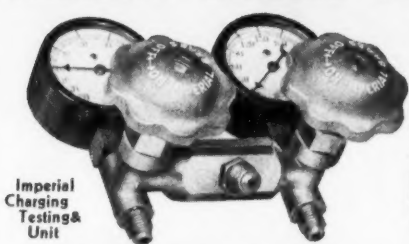
32-27 QUEENS BLVD., LONG ISLAND CITY, N. Y.
2021 COMMERCE ST., DALLAS, TEXAS

540 N. LA SALLE St., CHICAGO, ILL.
268 GRAYS INN RD., LONDON, W. C. 1

BUYER'S GUIDE

SPECIAL RATES APPLY TO THESE COLUMNS ONLY
WRITE ADVERTISING DEPT. FOR FULL INFORMATION

Modern Service of the Widest Range



With IMPERIAL TOOLS and EQUIPMENT

THE broad scope of this line is illustrated by the Imperial Charging and Testing Unit. Used for charging gas in high and low sides, purging air or gas from high side, purging gas from gauge lines, setting expansion valves, controls, etc. Imperial "Sylpak" valves used. No. 200-C, each.....\$6.75

Order from your jobber. Write also for new catalog 77-E.

IMPERIAL BRASS MFG. CO.
565 S. Racine Ave. CHICAGO

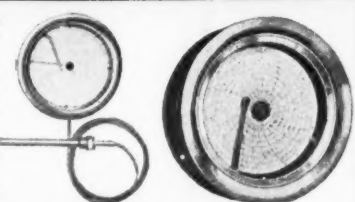
Refrigeration Instruments by Marsh

MARSH REFRIGERATION RECORDING GAUGES AND THERMOMETERS are available for all applications.

Recording gauges are available with dial reading pounds pressure per square inch for ammonia, Freon and other low pressure refrigerants and in pounds pressure per square inch or atmospheres for carbon dioxide.

Recording thermometers are available in standard ranges for all applications and with bulbs suitable for all media.

Multiple pen instruments can be used to record on the one chart temperatures at several points or, where desired, both pressure and corresponding temperature.



Jas. P. Marsh Corporation
2067 SOUTHPORT AVE., CHICAGO, ILL.

ROTARY SEAL REPLACEMENT UNITS FOR REFRIGERATOR COMPRESSORS



- QUICKLY AND EASILY INSTALLED
- SAVE TIME AND TROUBLE
- PREVENT SHAFT LEAKS

With the many acknowledged advantages ROTARY SEAL UNITS are unquestionable the most perfect replacement seal units available

STRONG, ECONOMICAL, SILENT
GUARANTEED TO GIVE PERFECT SATISFACTION

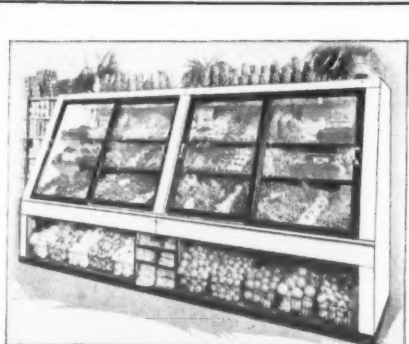
ROTARY SEAL COMPANY
801 W. Madison St. Chicago, Ill.

HENRY STRAINERS



SOLDERED SHELL WITH ASBESTOS SACK
For use where an exceptional degree of filtering is required. Drawn copper shell with soldered inlet cap. Due to relatively large area of the sack, a large amount of foreign matter can be collected before cleaning is necessary. Asbestos sack is supported inside of 80 Monel screen cylinder.

HENRY VALVE CO. 1001 19th ST. CHICAGO, ILL.
Stocked By Leading Jobbers



NEW SHERER PRODUCE CASE

The new SHERER Produce Case is the latest addition to Sherer's complete line of cases and coolers. Eliminates 8% to 10% loss factor caused by spoilage and shrinkage—keeps produce well refrigerated. New developments like this keep Sherer ahead of the parade!

Addition of the Sherer Case and Cooler franchise to your present line is your move for '37. Desirable territories still available. Write us for details.



"THERMO" FIN

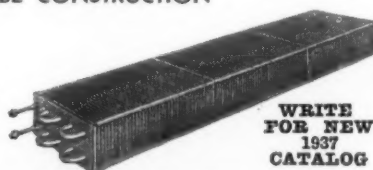
CLEAN CUT EYE APPEAL WITH RATED PERFORMANCE

OVERLAPPED COLLARED FIN TO TUBE CONSTRUCTION

INNER "THERMO" FIN IN TUBE

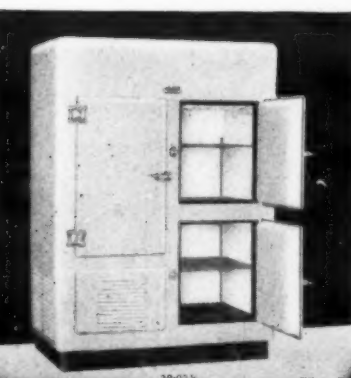
LARGE FULL ROUND RETURN BENDS

STRAIGHT SOLID FIN



WRITE FOR NEW 1937 CATALOG

MANUFACTURERS FIN COIL COMPANY
2505-7 So. Pulaski Road Chicago, Illinois



Streamlined Beauty THIS LINE SELLS ON SIGHT

Weber brings the result of 35 years of successful manufacturing experience. America's most beautiful line of Refrigerator Cases and Commercial Cabinets. Exclusive territories now open—Complete financing plan

Established 1902 Cable Address "Weberco"

WEBER SHOWCASE & FIXTURE CO., INC.
5700 Avalon Boulevard Los Angeles

Nema Manufacturers Report Sales of 2,067,257 Household Units to Distributors in 1936

The following 15 member companies of the Refrigeration Division of the National Electrical Manufacturers Association (Nema) reported household refrigerator sales for December, 1936: Apex Electrical Mfg. Co., Crosley Radio Corp., Fairbanks Morse & Co., Frigidaire Corp., General Electric Co., Gibson Electric Refrigeration Co., Leonard Refrigerator Co., Kelvinator Corp., Norge Corp., Servel, Inc. (export only), Stewart-Warner Corp., Sunbeam Electric Mfg. Co., Uniflow Mfg. Co., Uni-

versal Cooler Corp., and Westinghouse Electric & Mfg. Co. Member companies not reporting included: Jomoco, Inc., Merchant & Evans Co., and Sparks-Wilmington Co.

The sales of the reporting companies do, however, include units manufactured for the following concerns: Major Appliance Corp., Montgomery Ward & Co., Potter Refrigerator Corp., and Sears, Roebuck & Co.

SALES FOR YEAR, 1936							
Lacquer (Exterior) Cabinets Complete		Domestic		Canadian		Other Foreign	
	Quantity	Value	Quantity	Value	Quantity	Value	Value
1. Chest	1,897	\$ 611,220	285	\$ 13,836	1,943	\$	99,464
2. Less than 3 cu. ft.	1,583	89,576			48		2,712
3. 3 to 3.99 cu. ft.	56,526	2,915,457	1,234	75,347	29,616		1,697,825
4. 4 to 4.99 cu. ft.	271,290	17,775,415	5,817	592,332	46,713		3,032,895
5. 5 to 5.99 cu. ft.	463,035	35,867,086	7,525	605,187	18,867		1,494,806
6. 6 to 6.99 cu. ft.	560,287	45,791,573	2,297	199,304	15,090		1,281,892
7. 7 to 7.99 cu. ft.	149,736	15,591,987	2,353	204,438	5,834		617,438
8. 8 to 9.99 cu. ft.	29,523	2,992,777	36	5,695	754		93,528
9. 10 to 12.99 cu. ft.	237	45,618	2	309	91		14,531
10. 13 cu. ft. and up	40	8,302			11		2,182
11. Total Lacquer	1,545,154	\$121,639,011	22,549	1,754,479	118,957		6,537,249
Porcelain (Exterior) Cabinets Complete							
12. Up to 4.99 cu. ft.	12,852	557,343	511	41,561	1,170		93,931
13. 5 to 5.99 cu. ft.	56,699	5,698,390	555	47,939	3,725		328,027
14. 6 to 6.99 cu. ft.	122,366	11,405,773	381	36,712	2,145		211,315
15. 7 to 7.99 cu. ft.	54,809	6,223,523	164	18,263	2,135		252,131
16. 8 to 9.99 cu. ft.	30,452	3,839,782	111	13,659	1,549		215,438
17. 10 to 12.99 cu. ft.	4,442	762,113	17	3,094	667		111,336
18. 13 cu. ft. and up	3,119	737,770	15	4,662	545		130,799
19. Total Porcelain	294,763	23,564,694	1,753	165,593	11,945		1,344,937
20. Total—Lines 11 and 19	1,839,917	151,333,705	24,302	1,920,063	130,901		7,882,186
21. Separate Systems							
1/2 Hp. or Less	50,016	1,727,294	134	4,847	17,400		788,053
22. Separate Household Evaporators	2,439	58,928	368	6,280	1,759		35,636
23. Total—Lines 20, 21, 22	1,892,378		24,805		150,070		
24. Condensing Units							
1/2 Hp. or Less	5,559	342,000	275	16,315	3,935		232,992
25. Cabinets—No Systems	8,766	293,870	7	549	2,137		65,775
26. Total Household		\$153,758,797		\$1,948,363			\$10,867,572

Nema Household Sales for December Total 125,718 Units

SALES FOR DECEMBER, 1936					
Lacquer (Exterior) Cabinets Complete		Domestic		Canadian	
Quantity	Value	Quantity	Value	Quantity	Value
1. Chest	191	\$7,967	2	\$88	\$2,403
2. Less than 3 cu. ft.	41	2,471			
3. 3 to 3.99 cu. ft.	2,502	143,157	9	536	3,040
4. 4 to 4.99 cu. ft.	12,738	818,190	406	27,378	4,288
5. 5 to 5.99 cu. ft.	30,052	2,280,618	634	48,208	1,225
6. 6 to 6.99 cu. ft.	34,019	2,915,293	230	19,798	1,202
7. 7 to 7.99 cu. ft.	12,004	1,192,958	136	13,829	464
8. 8 to 9.99 cu. ft.	3,671	402,342	5	532	74
9. 10 to 12.99 cu. ft.	210	21,809			
10. 13 cu. ft. and up	91	91			
11. Total Lacquer	95,213	7,762,935	1,422	110,379	10,340
Porcelain (Exterior) Cabinets Complete		Domestic		Canadian	
Quantity	Value	Quantity	Value	Quantity	Value
12. Up to 4.99 cu. ft.	690	51,979	10	851	44
13. 5 to 5.99 cu. ft.	4,651	403,623	4	348	751
14. 6 to 6.99 cu. ft.	7,331	713,010	7	684	231
15. 7 to 7.99 cu. ft.	3,058	334,549	5	577	84
16. 8 to 9.99 cu. ft.	1,695	211,494	4	455	52
17. 10 to 12.99 cu. ft.	210	21,809			
18. 13 cu. ft. and up	91	91			
19. Total Porcelain	17,730	1,771,103	30	2,945	1,197
20. Total—Lines 11 and 19	112,943	9,534,038	1,452	113,324	11,537
21. Separate Systems	991*	60,289*	120	4,320	374
22. Separate Household Evaporators	162	2,940	38	552	78
23. Total—Lines 20, 21, 22	112,119		1,610		11,989
24. Condensing Units	246	14,628	3	174	408
25. Cabinets—No Systems	1,926	80,373			258
26. Total Household		\$9,571,751		\$118,370	\$938,446

*Includes sales and credits reported by more than one company.

Air-Conditioning Orders Booked in November Valued at \$3,657,061

Item	Value of Orders Booked, 1936	November	Total, 11 Mos.
Total	\$3,657,061	\$39,337,544	
Air Conditioning Group—Total	1,063,142	16,794,866	
Unit Systems—			
Self-contained (shipped substantially complete)	106,728	1,980,419	
Not self-contained (shipped in sections), including refrigerating or cooling medium	477,603	5,823,858	
Central-station Systems, excluding installation if installed—Human comfort (including refrigerating or cooling medium sold separately or otherwise for air conditioning)*	177,194	4,655,315	
Industrial (including refrigerating or cooling medium sold separately or otherwise for air conditioning)*	88,419	864,324	
Refrigerating or cooling medium sold to contractors or other distributing outlets (not manufacturing air-conditioning equipment) for air-conditioning systems, when such knowledge as to the application is available	66,066	1,724,244	
Air washers, including pumps and motors and controls where furnished	50,292	663,718	
Air filters (not including sales of filters used with machinery other than fans)	9,795	201,149	
Humidifiers	87,045	881,839	
Fan Group—Total	\$1,311,403	\$13,228,057	
Fans, including bearings, pulleys or couplings (if furnished)—For public and semi-public buildings	128,935	1,554,424	
For general industrial uses	367,680	3,873,110	
For mechanical draft	157,820	1,601,651	
For jobber stocks and unknown uses	38,781	650,333	
Small housed and propeller fans—Direct connected small housed blowers with motors and control (merchandise motors)	139,297	1,357,963	
Propeller fans, direct connected and belted (for ventilation only)	393,234	3,261,696	
Driving mechanism for general fan use (not reported above)—Electric motors and controllers (manufactured or jobbed)	78,577	832,866	
Steam engines (manufactured or jobbed)			
Steam turbines (manufactured or jobbed)	7,099	96,004	
Unit Heater Group—Total	\$1,282,516	\$9,314,621	
Industrial Type Unit Heaters, including heating element and motors where furnished—Equipped with blower-type (centrifugal) fans	191,536	1,390,901	
Equipped with propeller-type fans	798,951	4,557,584	
School-Room Type Unit Heaters, including heating element and motors and control where furnished	62,077	1,582,814	
Indirect Heating Surface (not including unit heater surface)—Steel pipe coil type (manufactured or jobbed)	6,556	26,091	
Cast iron type (manufactured or jobbed)	14,825	146,644	
Copper or aluminum type (manufactured or jobbed)	208,571	1,610,587	
*Includes incidental equipment, such as temperature, motor, humidity, and electrical controls, dampers, outlets, etc., as are sold with each.			

Sale of 135,100 Units In December Sets New Record

(Concluded from Page 1, Column 2) table published on page 1 of the Jan. 6 issue.

Reason for this disparity was that while the editors figured that 1936 December sales would show a good gain over December sales in 1935, they did not foresee that sales in December, 1936, would almost double those of the past December, which is almost what happened, since 135,100 units were sold in the final month of 1936 against 79,240 units sold in the corresponding month the preceding year.

Sales by Nema member companies of 125,718 units in December of this year also set a record, and brought the total for the Nema members for the year to 2,067,257 units, the first time sales by this group have passed the 2 million mark.

Wired Homes in U. S. Estimated At 21,887,774

(Compiled by Electrical Merchandising)	
Maine	167,224
New Hampshire	114,212
Vermont	70,859
Massachusetts	1,069,535
Rhode Island	170,143
Connecticut	331,953
New England	2,025,926
New York	3,143,696
New Jersey	998,493
Pennsylvania	1,906,103
Middle Atlantic	6,048,292
Ohio	1,458,481
Indiana	616,676
Illinois	1,629,838
Michigan	993,568
Wisconsin	574,681
East North Central	5,273,244
Minnesota	426,044
Iowa	408,594
Missouri	590,022
North Dakota	56,135
South Dakota	69,036
Nebraska	204,359
Kansas	287,289
West North Central	2,041,479
Delaware	43,330
District of Columbia	462,151
Virginia	249,877
West Virginia	183,155
North Carolina	266,742
South Carolina	106,394
Georgia	204,639
Florida	243,468
South Atlantic	1,759,559
Kentucky	247,455
Tennessee	229,577
Alabama	168,326
Mississippi	79,515
East South Central	724,903
Arkansas	96,981
Louisiana	187,937
Oklahoma	231,230
Texas	623,308
West South Central	1,139,456
Montana	81,125
Idaho	79,692
Wyoming	30,055
Colorado	173,443
New Mexico	26,968
Arizona	59,854
Utah	103,339
Nevada	19,208
Mountain	574,284
Washington	393,861
Oregon	218,577
California	1,690,193
Pacific	2,302,631
TOTAL FOR UNITED STATES	21,887,774

CONDENSERS
COMMERCIAL
EVAPORATORS
DOMESTIC
EVAPORATORS
COMFORT
COOLERS
MARKET
COOLERS
AIR CONDITIONING
SURFACE
UNIT HEATERS
BLAST HEATING
SURFACE
CATALOGS ON
REQUEST

McCord Radiator & Mfg. Co.
DETROIT, MICH.

Tagliabue Introduces New Industrial Controller

BROOKLYN—C. J. Tagliabue Mfg. Co. has just introduced an improved model in its line of self-operating temperature controllers which are used in industrial applications.

Improvements in the new model include an entirely new design of flexible seamless metal bellows, and numerous minor refinements of design, material and workmanship.

This new model is suitable for industrial applications, where the close control obtainable with auxiliary power is unnecessary, or where the

steam pressure available is less than 10 lbs. per sq. in. (necessary for opening the Tag steam-operated controller).

Temperature ranges are approximately 75°, between the limits of 30° F. and 450° F. Valves are semi-balanced, in sizes from 1/2 to 2 inches.

California Coil Maker Expands Operations

LOS ANGELES, Calif.—Refrigeration Engineering, Inc., manufacturer of refrigeration coils, expanded its operations on Feb. 1 and is now located in a building of 75x140 feet.

INFORMATION FOR SERVICE MEN

Treatment of Sulphur Dioxide Eye Burns Outlined by Doctor

Editor's note: The following information is extracted from an article "First Aid and After-Care in Eye Burns," published in the *Journal of Osteopathy*. It was written as a result of the treatment of a severe case of sulphur dioxide eye injury suffered by a refrigeration service man when a cylinder of the refrigerant exploded close to his face.

It is published by AIR CONDITIONING AND REFRIGERATION NEWS

(From "First Aid and After-Care in Eye Burns," by A. C. Hardy, D.O., F.I.C.O., first published in June, 1936 issue of the "Journal of Osteopathy")

AN experience with great number of eye burns, due to a variety of causes, some of which have reached the hospital many hours after the accident and with little if any preliminary attention, would seem to indicate that a discussion of the care and treatment of such cases would be in order. Some of these cases come directly to the hospital and receive immediate attention, but the victims of accidents which occur some distance away must usually see their local physician for advice and first-aid, and may not be able to reach the hospital for a considerable period of time.

The lack of proper attention at the time of the accident may result in still further damage to the eyes from infection, from friction of raw surfaces, etc.

The history of the accident is sufficient to enable us to determine the nature of injury to the eyes, and it only remains to ascertain the extent of the damage.

The cornea is likely to be severely burned, as well as the exposed surface of the conjunctiva. The depth of the burn will depend upon the length of the exposure and the concentration of the damaging agent, if a chemical. The patient is usually in great pain, the eyelids are forcibly closed, edematous, and, in the case of fire burns, blistered, and the lashes and eyebrows are burned away.

In the case of gas burns the skin surface will most likely show no injury. There is always great lachrymation and photophobia.

When such a case is first seen the physician in charge may not be able to determine the exact extent of the injury to the eyes, and may not be prepared even though he may be fully qualified to administer the necessary treatment.

He can, however, and should render first-aid to the case, and get the patient immediately to a hospital and in the hands of a competent ophthalmologist.

Any delay may be costly in both time and suffering, as well as in the ultimate outcome of the damaged eyes. Such first-aid procedure should be definitely understood.

First Aid

In the case of chemical burns the first thought is usually to apply something to the eye to neutralize the chemical which did the damage. As a rule this will not be possible or practical, for two reasons; first, the chemical which damaged eye is usually present in very small quantity, and it has been immediately diluted if not actually neutralized by the tears and the other fluids of the tissues; and second, it is impractical because the agent required to neutralize such a corrosive substance may be just as damaging to the eye as the original chemical.

In the case of acid burns one may irrigate the eye with a weak solution of sodium bicarbonate, or sodium chloride, but it is questionable whether this does any good from the standpoint of neutralizing the damaging agent. It does good as cleansing agent, removing infection, dirt and other irritating material.

The first step therefore should consist in thoroughly but very gently cleansing the eye, preferably with a warm saline or boric acid solution.

The second step should consist in filling the eye with sterile vaseline, or some other bland oil, and carefully bandaging the eyes. The vaseline serves as a protective lubricant to diminish friction between the roughened membranes, and to prevent further damage from this source. The bandage serves to protect the injured eyes from light, as well as the entrance of infection.

If the patient will be unable to

reach the hospital for several hours a drop of atropine sulphate (1% solution) should be instilled in the eye. This will aid materially to reduce the pain, and will lessen the danger of a complication iritis.

Hospital Treatment

When the patient reaches the hospital the ophthalmologist will proceed with a definite routine designed to ascertain the exact extent of the injury, to protect the eye from further damage and to secure healing.

The first step consists of opening the lids gently to permit inspection of the cornea and conjunctiva. Great care is exerted to avoid traumatism to the friable tissues that have been burned.

The eyes are again irrigated thoroughly with warm saline, or boric acid, solution for cleansing purposes, and to relieve the intense pain which has been aggravated by the spasm of the lids.

Fluorescein (2% solution) is next instilled, and the eyes are again irrigated. This staining solution will mark out definitely the burned areas, and the intensity of the staining will give definite information as to the depth of the burn.

The first step in treatment consists of the instillation of some type of antiseptic periodically, to prevent infection of the raw surfaces. The conjunctival sac always contains infection, and the burned tissues are easy prey to such infection.

Mercuric oxide, yellow, in a 1% ointment is usually acceptable, but in the deeper burns it may prove too stimulating and boric acid or some other milder antiseptic will have to be used.

If the cornea has been injured atropine sulphate (1% solution or ointment) will be instilled, and this will be repeated at sufficiently frequent intervals to secure and maintain complete dilation of the pupil.

Iritis always enters in when the cornea is injured or diseased, hence atropine is necessary to relieve pain, to prevent synechia, to secure muscle relaxation, good lymph drainage, etc. It must be continued at less frequent intervals until all iritis subsides, and this will always be some time after the cornea has fully healed.

The next rule of treatment requires that liberal quantity of sterile vaseline, or other protective emollient, be kept in the eye at all times, to protect against friction, and consequent pain and further damage, and to prevent adhesions between the raw surfaces.

If the medication is used in ointment form, and a liberal quantity is used at frequent intervals, this may suffice to meet both needs. In fact usually the antiseptic, the atropine and the vaseline may be combined in the one application.

The eyes should be bandaged at all times except when being treated, as long as the cornea presents a raw surface. If the lids are severely blistered a bandage may prove impractical, and in that case cotton lint, thoroughly covered with vaseline may be used to cover the eyes.

When the cornea has healed, as evidenced by the fact that it no longer stains with fluorescein the bandage should be removed, and the eyes be protected with dark glasses only. The remaining inflammation will heal much more rapidly when air is allowed to contact the eyes.

In case the skin of the lids is burned, as will be true in fire burns, we have found a most satisfactory treatment the spraying on the burned areas of a saturated solution of gentian violet. This makes very promptly a flexible eschar over all raw surfaces, and stops immediately the pain, burning and watery discharge from the injured areas. The skin heals promptly under this eschar, with a minimum of scar and contraction.

When the eyes have fully healed, the bandage has long since been removed, even dark glasses are no longer found necessary, as all redness and sensitiveness to light has disappeared, the patient should be instructed to return for a careful check of his vision, and a refraction.

The more superficial injuries may heal and leave normal vision without the aid of lenses, but the deeper burns must heal with a certain amount of scar tissue which may serve to alter the curvature of the cornea and make an astigmatism which did not exist before the injury. The correction of such an error may enable you to bring the patient's vision up to 20-20, when otherwise you might dismiss him with sub-normal vision.

BUYER'S GUIDE

SPECIAL RATES APPLY TO THESE COLUMNS ONLY
WRITE ADVERTISING DEPT. FOR FULL INFORMATION

CHIEFTAIN

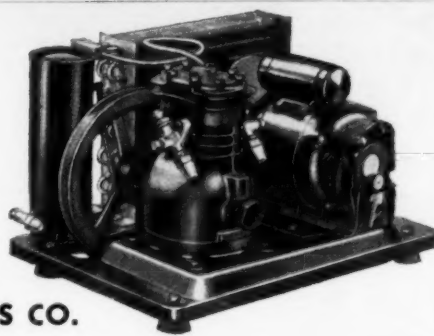
QUALITY-BUILT COMPRESSORS and CONDENSING UNITS

The CHIEFTAIN line represents precision manufacture and proven service, and is designed for all domestic and light commercial applications.

Sizes range 1/2 to 3/4 HP.

Write for prices.

TECUMSEH PRODUCTS CO.
TECUMSEH, MICH.



EXACT REPLACEMENTS

The finest, most dependable thermostat ever built for domestic refrigerators—in the most complete line of exact replacements! Ask your Ranco Jobber. Write for Bulletin No. 655.

RANCO, Inc., Columbus, Ohio

RANCOSTAT

The ORIGINAL Stainless Steel Thermostat

MILLS COMPRESSORS

for Commercial Use

Mills Novelty Company • 4100 Fullerton Avenue • Chicago, Illinois

Commercial Condensing Units

offer you:

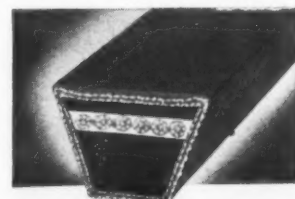
- RADIAL CRANKCASE—MRK-SR cylinder can be tipped 45° right or left to save head space. Total height only 7".
- VIBRATIONLESS—Perfect alignment of parts assured by 4 master tie-bolts.
- PRECISION—Machine finished parts insure clean, scale-free oil.

Write for prices and details

Commercial Refrigeration Co., Inc.
U. S. Patents 1897907—1969237—2018067—2043176
55 South Avenue Rochester, N. Y.

REMPE FIN COILS - for Commercial Use PIPE COILS & BENDS

Rempe Company, 340 N. Sacramento Blvd., Chicago, Illinois



Get a Gilmer V-Belt HAS FIVE FEATURES!

1. Top tension rubber.
2. Endless pulling cord locked in permanent horizontal plane.
3. Brute-strength bottom rubber.
4. Triple-wear double jacket.
5. Controlled stretch.

Lasts longer. Grips tighter. Stays quiet. Sleeved and plainly sized, for all small-unit equipment. Get catalogue.

L. H. GILMER CO., Tacony, Philadelphia

Each Succeeding Day
finds

KOLD-HOLD

more firmly entrenched
as the predominant system
of Truck Refrigeration

KOLD-HOLD MFG. CO., LANSING, MICH.

KRACK ENGINEERS

LIFETIME COILS AND UNITS

REFRIGERATION APPLIANCES, INC.

1342 W. Lake Street, Chicago

BRUNNER

Send for the New
REFRIGERATION CATALOG

Five Models of Compressors
Forty-seven Models of Condensing
Units from 1/4 H.P. to 15 H.P.

BRUNNER MANUFACTURING CO.
UTICA, N. Y., U. S. A.

COMMONWEALTH FITTINGS

Built Right to Stay Tight



COMMONWEALTH
BRASS CORPORATION
COMMONWEALTH AVE. AND 6TH ST.
DETROIT

TEMPRITE

INSTANTANEOUS
BEER and WATER COOLERS

Detroit Michigan

BUYER'S GUIDE

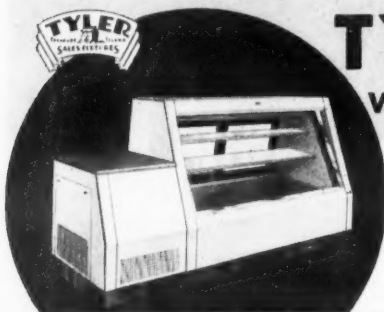
SUPPLIERS WHO SPECIALIZE IN SERVICE TO THE REFRIGERATION AND AIR CONDITIONING INDUSTRIES



Puro ELECTRIC WATER COOLERS

Thoroughly reinforced all steel attractively finished cabinets.
Complete line of different Models and Capacities.
Write for details and sales prices.

Puro Filter Corporation of America
440 Lafayette Street, New York City Spring 7-1800



TYLER'S WELDED STEEL Cases

1937 line offers wide variety and sensational values. 6 big new features and iron-clad guarantee. Only Tyler gives one-piece "welded steel" construction, 100% insulation. Wonderful sales opportunity. Most talked of and fastest selling line on market. WRITE today.

TYLER Sales-Fixture COMPANY
Dept. E, NILES, MICHIGAN

SIX BIG NEW FEATURES

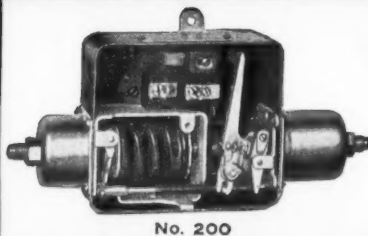


MANUFACTURERS

Seamless
Brass & Copper Tubing
Refrigerator Tubing
Water Service Tubing
Carton Packed Tubing
Formed Tubing
Electro Tin Plated Tubing

WRITE US FOR BULLETIN AND PRICES

RED
SEAL



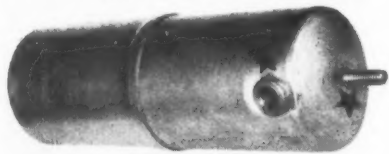
RED SEAL CONTROLLER COMPANY
1024 SO. FIFTH ST. MILWAUKEE, WIS.

RED SEAL CONTROLS
for
Perfect Performance

Sales Agents and Distributors
Wanted. Desirable Territory
Open.

BRAZED IN CONTROLLED ATMOSPHERE

This receiver tank is made with special stampings brazed in a controlled atmosphere electric furnace. This process is the newest of our facilities for producing Pressed Metal Products. We furnish stampings, assemblies, hydrogen brazing and enameling. Stamped compressor bases are one of the many items we supply. Check us for prices.



Acklin

THE ACKLIN STAMPING CO.
Toledo, Ohio Chicago, Illinois
Detroit, 2-165 General Motors Bldg.

U. S. REFRIGERATION GAUGES

Standard
of the
Trade



All types of Gauges
for refrigeration service
and original
equipment.

Always
ACCURATE...
RUGGED...
DEPENDABLE



U. S. GAUGE CO.

44 BEAVER STREET NEW YORK

HIGHEST Filtrine EFFICIENCY

WATER COOLERS

COMMERCIAL — AIR CONDITIONING

From 2 gals. per hour to 500 gals. per minute

WATER FILTERS — STEEL PIPE COILS — SURGE TANKS

FILTRINE MFG. CO., Brooklyn, N. Y.

- PATENTS -

Issued December 29, 1936

2,065,536. REFRIGERATING APPARATUS. Lawrence A. Philipp, Detroit, assignor to Kelvinator Corp., Detroit. Application June 20, 1932. Serial No. 618,127. Renewed Jan. 16, 1936. 15 Claims. (Cl. 62-116)

2,065,537. REFRIGERATING APPARATUS. Lawrence A. Philipp, Detroit, assignor to Kelvinator Corp., Detroit. Application Feb. 27, 1933. Serial No. 658,722. Renewed July 15, 1936. 17 Claims. (Cl. 62-126)

2,065,538. REFRIGERATING APPARATUS. Donald H. Reeves, Dayton, assignor, by mesne assignments, to General Motors Corp., Application July 31, 1930. Serial No. 471,928. Renewed Nov. 13, 1935. 30 Claims. (Cl. 62-99)

2,065,542. REFRIGERATING APPARATUS. Harry F. Smith, Dayton, assignor, by mesne assignments to General Motors Corp., Application Nov. 24, 1930. Serial No. 497,704. Renewed Aug. 23, 1934. 22 Claims. (Cl. 62-126)

2,065,543. REFRIGERATING APPARATUS. Harry F. Smith, Dayton, assignor, by mesne assignments, to General Motors Corp., Application July 30, 1931. Serial No. 554,060. Renewed May 3, 1935. 24 Claims. (Cl. 62-126)

2,065,579. REFRIGERATING SYSTEM. Harold M. Graham, Buffalo, assignor to Ross Heater & Mfg. Co., Inc., Buffalo. Application Feb. 24, 1932. Serial No. 594,843. 1 Claim. (Cl. 62-152)

2,065,586. METHOD AND MACHINE FOR MAKING FINNED TUBE HEAT EXCHANGERS. Anthony F. Hoessel, Chicago, assignor to Peerless Ice Machine Co., Chicago. Application Feb. 8, 1934. Serial No. 710,262. 24 Claims. (Cl. 29-84)

2,065,596. REFRIGERATING APPARATUS. David E. Macabee, Dayton, assignor, by mesne assignments, to General Motors Corp., Application March 30, 1929. Serial No. 351,362. 4 Claims. (Cl. 62-8)

2,065,604. REFRIGERATING APPARATUS. Ralph K. Miller, Dayton, assignor to General Motors Corp., Dayton. Application March 26, 1934. Serial No. 717,377. 3 Claims. (Cl. 62-116)

2,065,812. THERMOSTATIC VALVE. James A. Kinnard, Detroit. Application May 8, 1935. Serial No. 20,308. Renewed April 20, 1936. 16 Claims. (Cl. 236-34)

2,065,835. TEMPERATURE CONTROL METHOD AND MEANS. Daniel G. Taylor, Minneapolis, assignor to Minneapolis-Honeywell Regulator Co., Minneapolis. Application Feb. 2, 1931. Serial No. 512,887. 31 Claims. (Cl. 236-91)

2,065,841. AUTOMATIC TEMPERATURE CONTROL APPARATUS. Fritz Frederick Uehling, Passaic, N. J., assignor to Minneapolis-Honeywell Regulator Co., Minneapolis. Application June 29, 1932. Serial No. 619,841. Renewed May 7, 1936. 20 Claims. (Cl. 236-91)

2,065,871. AIR AND LIQUEFIER. Wilhelm Rehms, Stuttgart, Germany. Application Jan. 26, 1935. Serial No. 3,609. Renewed Sept. 8, 1936. 4 Claims. (Cl. 183-45)

2,065,873. HEATING AND VENTILATION. Alonzo W. Ruff, York, Pa., assignor to York Ice Machinery Corp., York, Pa. Application March 17, 1933. Serial No. 661,408. 16 Claims. (Cl. 257-9)

2,065,949. BEER COOLING AND DISPENSING SYSTEM. Harry J. Sandell, Ashby, Minn. Application Oct. 6, 1933. Serial No. 692,360. 5 Claims. (Cl. 62-102)

2,065,955. CENTRIFUGAL COMPRESSOR. Charles Raymond Waseige, Ruell, Malmaison, France, assignor to Eclipse Aviation Corp., East Orange, N. J. Application Jan. 23, 1934. Serial No. 707,952. In France Jan. 26, 1933. 2 Claims. (Cl. 230-130)

2,066,042. SELF-FREEING ICE TRAY. Donald Branch Knight, Brooklyn, N. Y., assignor by mesne assignments, to General Motors Corp., Application April 16, 1931. Serial No. 530,501. 21 Claims. (Cl. 62-108.5)

2,066,124. REFRIGERATOR CABINET. Arthur E. Rinker, Compton, Calif. Application Oct. 9, 1935. Serial No. 44,207. 11 Claims. (Cl. 62-101)

2,066,161. REVERSIBLE REFRIGERATING SYSTEM. Edward W. Roessler, Nutley, N. J., assignor to General Electric Co., Application March 6, 1936. Serial No. 67,497. 1 Claim. (Cl. 137-78)

2,066,162. THERMOSTATIC CONTROL. John A. Spencer, Newtonville, Mass., assignor to General Plate Co., Attleboro, Mass. Original application Oct. 14, 1932. Serial No. 637,854. Divided and this application Aug. 27, 1934. Serial No. 741,547. 4 Claims. (Cl. 236-48)

2,066,177. LUBRICATING SYSTEM. Wilfrid E. Johnson, Schenectady, assignor to General Electric Co., Application Oct. 24, 1935. Serial No. 46,569. 12 Claims. (Cl. 184-6)

2,066,235. REFRIGERATING APPARATUS. Jacob Smilack, Dayton, assignor, by mesne assignments, to General Motors Corp., Application Dec. 30, 1931. Serial No. 583,925. 3 Claims. (Cl. 62-4)

2,066,236. REFRIGERATING APPARATUS. Harry F. Smith, Dayton, assignor, by mesne assignments, to General Motors Corp., Application Feb. 28, 1931. Serial No. 519,117. 7 Claims. (Cl. 62-5)

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

